

# **U.S. NAVY WEAR TEST AND USER EVALUATION OF ENLISTED UTILITY UNIFORMS**



**Navy Clothing and Textile Research Facility  
Natick, Massachusetts**

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## **Executive Summary**

The Navy Clothing and Textile Research Facility (NCTRF) investigated five candidate utility uniforms as possible replacements to the current utility (dungaree) uniform. The candidates were planned to overcome longstanding complaints of poor fit, pockets that are not useful, poor durability, and unattractive appearance. Testing was conducted in two phases: Phase I tested two commercial off-the-shelf uniforms currently available from uniform rental companies. Phase II tested commercially available materials made to Navy patterns.

### **Phase I - Commercial Off-the-Shelf**

Over 460 male and female subjects were issued two uniforms to wear in place of their current utility uniform for six months. Three test sites were used, the U.S.S. Monongahela, U.S.S. Nimitz, U.S.S. Stennis. User preference surveys were collected at the three and six month points.

The candidate uniforms were as follows: *Configuration A* :4 oz 65% polyester/35% cotton poplin medium blue shirts & 7 oz 65% polyester/35% cotton twill navy blue pants; *Configuration B*: 4 oz 65% polyester/35% cotton chambray shirts & 14.5 oz 100% cotton denim pants.

Approximately 150 subjects completed surveys for both periods. Both uniforms were found to be acceptable in the areas of fit, design and utility, durability, comfort, and overall acceptance. However, for almost all areas, Uniform B (4 oz 65% polyester/35% cotton chambray shirts 14.5 oz 100% cotton denim pants) was preferred.

### **Phase II - Modified Commercial**

1278 male and female subjects were each issued the three uniforms to wear in place of their current utility uniform for six months. Approximately 50% of the subjects were located in Norfolk, VA and the other 50% in San Diego, CA. The subjects were crew members of one of 15 participating ships and commands. Demographic and sizing information were collected when the uniforms were issued. Subjects were instructed to wear each uniform in rotation, changing each uniform as it needed laundering. Representatives from NCTRF visited the test subjects at three and six months. At these points, comprehensive fit and user preference surveys were issued and completed by the subjects.

The candidate uniforms were as follows: *Configuration A*: 4 oz 100% cotton chambray shirts & 11.3 oz 100% cotton denim pants; *Configuration B*: 4 oz 100% cotton chambray shirts & 14.5 oz 100% cotton denim pants; *Configuration C*: 4 oz 65% polyester/35% cotton poplin shirts & 7 oz 65% polyester/35% cotton twill pants.

In total, 501 subjects completed surveys for all periods. The poly/cotton shirt (Shirt C) was found to be acceptable in all test areas. In comparison, the chambray shirt (Shirt A/B) was found to be uncomfortable in hot conditions, and after laundering was hard to maintain its appearance. When compared to the current uniform, Shirt C was favored slightly less. Thus, it was concluded that neither of the shirts would be adequate to replace the current shirt.

The pants, however, were found to be acceptable in all areas, and liked better than the current dungarees. There were significant problems for the females for the twill trouser (Pant C): approximately 50% of all female subjects could not be fit. This, however, was most probably due to an incorrect sizing tariff at issue.

It is recommended that the current shirt be kept, and that the current dungarees be replaced by any of the three pant configurations. Pant C, it is likely to be the best choice for replacement to the current dungaree pants. The logic behind this recommendation is as follows: despite the fit problem attributed to an inventory rather than a pattern problem, female subjects preferred Pant C to either Pants A or B; while male subjects preferred Pants A & B to C, they found Pant C to be acceptable and preferred them to the current dungarees pants. Given the females' clear preference for Pant C and that males found them to be acceptable replacements for the current uniform, Pant C appears to be an acceptable replacement. Throughout this report all responses were calculated for the overall group of respondents; both male and female. When there was a significant difference in responses by gender than these are listed separately.

## Introduction

The current Navy Utility Uniform, commonly called the *dungaree* uniform, has been with the Navy for almost 60 years. The current uniform consists of a light blue chambray shirt and dungaree style pants with *bell bottoms* and patch style pockets. The pants have been maligned for being baggy and ill fitting and their pockets have been criticized for their lack of utility.

In order to improve the current utility uniform, The Navy Clothing and Textile Research Facility (NCTRF) investigated the possibility of replacing the current utility uniform. Toward this end, a market investigation was conducted of commercial uniforms. It showed that the two most common types are comprised of poplin shirts and twill pants, or jeans and a work shirt. The poplin shirts are comprised of 4oz. polyester/cotton, and twill pants are made of 7 oz. polyester/cotton fabric. The jeans most commonly consist of 14.5oz 100% cotton denim material with straight legs, scoop style front pockets, and patch back pockets and are usually one of the three commercial brands, Levi®, Wrangler®, or Lee®. The shirts generally consist of a western style 4 oz. 100% cotton shirt.

In order to determine the acceptability of a new utility uniform, NCTRF conducted a user test of several candidates. These candidates were selected from commercially available work uniforms, and were comprised of a work shirt combined with either chino pants or jeans. The six month test was designed so that the candidate uniforms were worn in lieu of the current dungaree uniform. In an effort to subject the candidates to the most severe conditions possible, the test participants were selected from *flight deck crew*, *boatswain's mates* and *engineering ratings*.

All test participants were issued each configuration and were required to wear them with the same frequency. All garments were subject to normal shipboard laundering procedures. At the three month and at the end (6 months) of the test, a questionnaire was administered to measure several factors, including, but not limited to: fit, durability and preference of the test garments (and the differences between men and women, in particular).

The testing program was conducted in two phases. They are described below.

### **Phase I - Commercial Off-the-Shelf (COTS) Uniforms**

*Phase I* consisted of commercial uniform configurations available through uniform rental companies. They were comprised of the following materials:

Configuration A :     4 oz 65% polyester/35% cotton poplin medium blue shirts  
                                 7 oz 65% polyester/35% cotton twill navy blue pants

Configuration B: 4 oz 65% polyester/35% cotton chambray shirts  
14.5 oz 100% cotton denim pants

Two vendors were chosen to supply garments: Red Kap Industries from Nashville, TN, and Southern Apparel, from Robersonville, NC. Red Kap was selected because all of their garments are domestically produced. They produced the shirts for Configurations A and B and the pants for Configuration A. Southern Apparel produced the pants used for Configuration B (Note: *Off-the-shelf* commercial jeans were not included in this test due to problems associated with stone washing and/or enzyme washing or treatment to promote fading and degradation of the cloth. Also, some off-the-shelf jeans are produced with rivets which is a hazard).

Phase I was conducted onboard the USS John Stennis and USS Monongahela in Norfolk, VA and onboard the USS Nimitz in Bremerton, WA.

**Phase II - Modified commercial (Navy patterns with commercial fabrics)**

Phase II consists of garments made from current Navy patterns using commercial fabrics. This approach was used in order to eliminate the concept of fit from the evaluation of the commercial fabrics and modified designs. The new candidate fabrics would be tested without having also to evaluate the fit of a design. The test garments were produced by current Navy suppliers of clothing (shirts from Seagoing Uniform Co., Marshville, NC; twill trousers and slacks from Creighton, Inc., Reidsville, NC; denim trousers and slacks from Southern Apparel, Robersonville, NC). Test uniform configurations were as follows:

Configuration A: 4 oz 100% cotton chambray shirts  
11.3 oz 100% cotton denim pants

Configuration B: 4 oz 100% cotton chambray shirts  
14.5 oz 100% cotton denim pants

Configuration C: 4 oz 65% polyester/35% cotton poplin shirts  
7 oz 65% polyester/35% cotton twill pants

Phase II was conducted onboard nine ships/commands on the East Coast and eight ships/commands on the West Coast. They were as follows:

**East Coast**

USS George Washington (CVN-73)  
USS Jacksonville (SSN-699)  
USS Emory S. Land (AS-39)

**West Coast**

USS Comstock (LSD-45)  
USS Boxer (LHD-4)  
USS McKee (AS-41)

East Coast

USS Wasp (LHD-1)  
USS Arctic (AOE-8)  
USS Briscoe (DD-977)  
NAS, Norfolk  
SIMA, Norfolk  
VRC-40

West Coast

USS LaJolla (SSN-701)  
USS Constellation (CV-64)  
CVW-2  
SIMA, San Diego  
NAS North Island

In order to assess the performance and acceptability of these new uniforms, they were subjected to six months of shipboard tests occurring simultaneously on both coasts. These tests were designed to measure both objective and subjective data regarding the *fit, design, utility, and durability* of the new uniforms. The results of both phases of this wear test are presented in this report.



## Phase 1 - Commercial Off-the-Shelf Uniforms

### Methodology

#### Design

A within-subject design was used to allow each subject to wear each uniform. By allowing each test participant to wear both uniform types, situational factors such as weather, job classification and geographic location were controlled.

#### Subjects

Four hundred and sixty two male and female subjects from three ships were originally issued both uniforms.

#### Procedures

The test period was six months. The two test uniforms were worn in place of subjects' current dungaree uniform. The test uniforms were worn in rotation, and were laundered as necessary.

Uniforms were initially issued based upon self-reported sizes. Garments were not issued until both the fitter and the subject felt that they were the proper size. An issue sheet (see Appendix A) was completed for each subject, detailing their self-reported size, the sizes of the garments issued and demographic information. The best fit possible was provided.

Test participants were visited at the three and six month points in the test, and were issued a *Wear Test Questionnaire* (see Appendix B). The questionnaire was the same for the mid- and end-points. The mid- and end-point data collections were used to determine how well the garments stood up over time. The user questionnaires were designed to obtain information on: fit, design, utility, durability and comfort.

#### Wear Test Questionnaires

*Fit and Preference* questionnaires were used to elicit test participants' opinions about the shirts and pants in this phase of the study. The questioners were divided into five sections, each addressing the following factors: *fit*, *design* and *utility*, *durability*, *comfort*, and *overall acceptance*.

Fit was characterized by asking test participants to rate the garment along several dimensions. For example, *Fit* was rated on a five-point scale, ranging from *Dislike Very Much* to

*Like Very Much*. In addition, five-point scales were used to evaluate the *length* and *type of fit* of the garments.

The *Design* and *Utility* sections measured the degree to which the design of the garments were acceptable to the wearers.

The *Durability* section allowed test participants to rate the durability of the garments and detail any problem areas.

The *Comfort* section measured test participants' ratings of overall comfort, and comfort in hot and cold environments for each garment.

## Results

### Demographics of Respondents

Table 1 shows the number of surveys returned for each phase of the test. Approximately 150 subjects completed all three phases of the study. The difference in the number of respondents at each data collection point is a result of attrition of test participants, and of a difference in response rate at each data collection point (i.e., some subjects provided responses at only one of the two data collections).

Researchers involved in similar survey work - where test items are initially issued and the experimenters return at a later date to conduct surveys - assume that they will encounter an attrition rate of approximately 50%. In this study, because there were two data collections (and therefore, an additional chance for attrition) and the subjects who were used for the final analysis had to have completed surveys at **both** the mid and end points, it was expected that this number would be lower than 50%.

Indeed, the final group of subjects selected for analysis was approximately 33% of the original group. This is an acceptable attrition rate given the two data collections, and that the analysis included only those subjects who were present for both data collections.

TABLE 1

Returned Surveys

Survey Point	N
Issue	462
Mid	359
End	187
All Phases	150

### Demographic Information

Twenty six percent of all those who completed surveys were women. Table 2 lists the number of subjects from each ship who were issued garments.

TABLE 2

Number of Responses by Ship

Ship	N	%
Monongahela	76	16.5
Nimitz	118	25.5
Stennis	268	58.0

### Analysis of Shirt and Pants Data

The analyses of the shirt and pants data were conducted separately, with each being subjected to approximately 20 different analyses. Due to the large numbers of comparisons being made, the *Bonferoni correction* was applied to all analyses. The Bonferoni correction reduces the chances of obtaining false positive results (i.e., saying there is a difference in the data, when there is actually no difference). The following formula was used to implement the correction.

$$\begin{aligned}\text{Adjusted Significance Level} &= \text{Alpha Level/Number of Analyses} \\ &= 0.05 / 20 \\ &= 0.0025\end{aligned}$$

Except where stated, all scaled questions were subjected to split-plot Analyses of Variance (ANOVA), with garment type (Uniform A, Uniform B) and Data Collection Point (Midpoint, Endpoint) serving as within-subject variables, and gender serving as a between-subject factor.

## Shirts

### Fit of Shirts

Scale:

Dislike	Dislike	Neither Like	Like	Like
Very Much	Moderately	nor Dislike	Moderately	Very Much
1	2	3	4	5

TABLE 3

Mean Fit Ratings for Shirts

	Shirt A	Shirt B
	$\bar{x}$	$\bar{x}$
Overall Fit	3.80	4.09
Across Shoulders	3.83	4.04
Chest	3.81	4.05
Sleeve	3.61	3.89
Neck	3.67	3.96
Waist	3.76	4.00

Table 3 shows the mean ratings of *Fit* for each shirt. All ratings were positive, indicating that, in general, the fit of both shirts was liked moderately. The mean fit rating for Shirt B was significantly higher for all areas ( $F(1,142) \geq 10.41$   $p < 0.0025$  in all cases).

In addition, the *description of fit* mean rating was consistent for both shirts. Both shirts received an average rating of nearly 3.4 for all areas questioned. The data suggest an almost even split between shirts being rated as *neither too tight nor too loose* and *moderately loose*. The preference of fit data from Table 3 suggests that a slightly baggier fit was acceptable to test participants.

The mean ratings of sleeve length was, on average, rated as being *just right* and did not vary between shirts. However, when considering gender, the female mean rating was significantly higher ( $F(1,142) = 11.57$ ,  $p < 0.0025$ ) than was the males' ( $\bar{x} = 3.07$ , 3.39 for males and females, respectively). This suggests that a number of female subjects found the length of the shirt sleeves *slightly too long*. The overall fit mean ratings, again, clustered around *just right* (3.0) and were consistent for both shirts, regardless of data collection or gender.

### Design and Utility of Shirts

Table 4 lists the mean ratings for both shirts for all *design and utility* questions.

TABLE 4

#### Design and Utility Ratings

		Shirt A	Shirt B
		$\bar{x}$	$\bar{x}$
Overall Look	(1=Really Dislike, 5=Really Like)	3.24	3.76
Suitability to Job	(1=Very Unsited, 5=Very Suited)	3.26	3.42
Ease of Pocket Use	(1=Very Difficult, 5=Very Easy)	3.66	3.74

The mean ratings for *overall look* differed significantly by garment ( $F(1,140)=24.48$ ,  $p<0.0025$ ). Shirt A, in general, was rated 3.24 (fair), while Shirt B received an average rating of 3.76 (*like*). Thus, test participants were neutral about the overall look of Shirt A, while they had a preference for Shirt B.

With respect to suitability to performing their jobs, test participants rated both shirts positively. Ratings for both shirts fell between *OK* and *somewhat suited*. There was no statistical difference between shirt ratings.

Pockets were found to be *fair* to *somewhat easy* to use, with the mean ratings for both shirts falling above 3.5. There was no significant difference between shirt ratings.

### Durability

Table 5 lists the mean ratings for *durability* and *maintenance of appearance*.

TABLE 5

#### Durability Ratings

		Shirt A	Shirt B
		$\bar{x}$	$\bar{x}$
Durability	(1=Not Durable, 5=Very Durable)	3.74	3.83
Maintenance of Appearance	(1=Very Poorly, 5=Very Well)	3.73	3.71

Both shirts received positive mean durability ratings. There were no significant differences between shirt ratings. Similarly, both shirts received positive mean ratings for maintaining their appearance after laundering.

### Comfort

Table 6 lists the mean ratings for comfort (*Overall and in hot and cold conditions*) of each shirt. Hot and cold were self determined by the respondents.

Scale:

Very Uncomfortable	Uncomfortable	Acceptable	Comfortable	Very Comfortable
1	2	3	4	5

TABLE 6

Comfort ratings in Hot and Cold Conditions and Overall

	Shirt A	Shirt B
	$\bar{x}$	$\bar{x}$
Overall	3.70	3.90
When Hot	3.30	3.50
When Cold	3.55	3.77

Overall, both shirts received a mean rating above 3.5 (between *acceptable* and *comfortable*). When in hot conditions, both were rated as acceptable; however, Shirt B's rating was significantly higher ( $F(1,131)=11.45, p<0.0025$ ), suggesting that Shirt B was seen as more comfortable in hot conditions. Similarly, Shirt B's mean rating in the cold was also significantly higher than was Shirt A's ( $F(1,136)=13.80, p<0.0025$ ). Taken together, these data suggest that Shirt B is more comfortable than Shirt A.

### Overall Rating

The overall rating given to each shirt is based upon the following scale:

Scale:

Very Poor	Poor	Fair	Good	Very Good
1	2	3	4	5

The mean *overall ratings* for each shirt were positive, between *fair* and *good* ( $\bar{x}=3.54$ , 3.84 Shirts A and B, respectively). These mean ratings differed significantly ( $F(1,139)=14.87$ ,  $P<0.0025$ ), suggesting that, overall, test participants favored Shirt B over Shirt A.

### Pants

#### Fit of Pants

Table 7 lists the mean fit preference rating for each pant for each fit area.

Scale:

Dislike Very Much	Dislike Moderately	Neither Like nor Dislike	Like Moderately	Like Very Much
1	2	3	4	5

TABLE 7

Mean Fit Ratings for Pants

	Pant A	Pant B
	$\bar{x}$	$\bar{x}$
Overall Fit	3.41	4.17
Waist	3.42	4.13
Seat Area	3.32	4.10
Length	3.55	4.03

All ratings for both pairs of pants were positive, indicating that the fit of both was *liked*. The mean fit rating for Pant B was significantly higher in all areas ( $F(1,143) \geq 41.02$   $p < 0.0025$  in all cases). The difference between the mean ratings scores is quite large for each area, suggesting that the fit of Pant B was favored over A.

The description of fit mean rating was consistent for both pairs of pants. Both had an average rating of approximately 3.3 for all areas questioned. The data suggest that, on average, the pants were rated as being *neither too tight nor too loose*.

The mean ratings of leg length did not vary between pants and, in general, were reported as *just right*. However, when gender was taken into account, the female mean score was significantly higher ( $F(1,141)=18.44, p<0.0025$ ) than was the males' ( $\bar{x}=3.07, 3.45$  for males and females respectively). This suggests that a number of female subjects found the length of the pant legs *slightly too long*. The *overall length* mean ratings clustered around *just right* (3.0) and were consistent for both pants, data collection points, and gender.

### Design and Utility of Pants

Table 8 lists the mean ratings for both pants for all *design and utility* questions.

TABLE 8

#### Design and Utility Ratings

		Pant A	Pant B
		$\bar{x}$	$\bar{x}$
Overall Look	(1=Really Dislike, 5=Really Like)	3.13	3.98
Design of Pant Leg	(1=Really Dislike, 5=Really Like)	3.34	3.85
Ease of Stenciling	(1=Very Difficult, 5=Very Easy)	3.96	3.55
Suitability to Job	(1=Very Unsited, 5=Very Sited)	3.15	3.52
Ease of Pocket Use	(1=Very Difficult, 5=Very Easy)	3.75	3.91

The mean *overall look* ratings differed significantly by garment ( $F(1,139)=46.45, p<0.0025$ ). Pant A, on average, was rated close to *fair* ( $\bar{x}=3.13$ ), while Pant B was rated close to *like* ( $\bar{x}=3.98$ ). Both means were, however, positive.

Both pants received positive ratings for the *design of the pant leg*. However, Pant B received significantly higher ratings ( $\bar{x}=3.85$ ) than did A (3.34),  $F(1,143)=14.57, p<0.0025$ .

In addition, both pants were rating positively for *ease of stenciling*. However, Pant A received a significantly higher ( $F(1,138)=27.61, p<0.0025$ ) mean rating ( $\bar{x}=3.96$ ) than did Pant B ( $\bar{x}=3.55$ ).



Both pants received positive mean ratings for suitability to job ( $\bar{x} = 3.15, 3.52$  A & B, respectively), with mean ratings close to *somewhat suited*. The ratings were, however, statistically different ( $F(1,139)=12.57, p<0.0025$ ), with Pant B being rated as being more suited to subjects' jobs.

The pockets were found to be *fair* to *somewhat easy* to use, with the mean ratings for both pants above 3.5. There were no significant differences between pants.

### Durability

Table 9 shows the mean ratings for *durability* and *maintenance of appearance*.

TABLE 9

#### Durability and Ease of Care Ratings

		Pant A	Pant B
		$\bar{x}$	$\bar{x}$
Durability	(1=Not Durable, 5=Very Durable)	3.69	4.03
Maintenance of Appearance	(1=Very Poorly, 5=Very Well)	3.68	3.61

Both pants received positive mean ratings for *durability* and *maintenance of appearance*, and there were no significant differences between the ratings.

### Comfort

Table 10 displays the mean ratings for *comfort* (in hot and cold conditions, and overall) for both pair of pants.

Scale:

Very Uncomfortable	Uncomfortable	Acceptable	Comfortable	Very Comfortable
1	2	3	4	5

TABLE 10

Comfort ratings in Hot and Cold Conditions and Overall

	Pant A	Pant B
	$\bar{x}$	$\bar{x}$
Overall	3.47	3.98
When Hot	3.38	3.42
When Cold	3.32	3.96

Ratings for *Overall* comfort and *comfort in hot and cold conditions* were positive for both pants. In *hot conditions*, both pants received similar mean ratings, which did not differ significantly. However, Pant B received significantly higher ratings in *cold conditions* and *overall* ( $F(1,137)=40.84, p<0.0025$ ;  $F(1,140)=21.31, p<0.0025$ , *cold conditions* and *overall*, respectively). These data suggest that Pant B was found to be more comfortable than was Pant A in most situations.

#### Overall Rating

The following scale was used to rate the *overall rating* for the pants:

Scale:

Very Poor	Poor	Fair	Good	Very Good
1	2	3	4	5

The mean overall ratings for the pants were positive, falling between *fair* and *good* ( $\bar{x}=3.42, 3.94$  Pants A and B, respectively). These mean ratings differed significantly ( $F(1,140)=14.58, P<0.0025$ ), suggesting that overall Pant B was favored more than Pant A.

## Discussion and Conclusions

### Shirts

For each of the five main factors of: fit, design and utility, durability, comfort, and overall acceptance, both shirts received positive and favorable ratings. This suggests that either shirt would be an adequate replacement for the current chambray shirt. However, it is clear from the data that Shirt B (chambray) was preferred over Shirt A (poplin). In four out of the five factors examined (*fit preference, overall look of the design, comfort in both hot and cold environments, overall rating*), Shirt B received significantly higher ratings than Shirt A.

### Pants

Similarly, both pairs of pants received positive and favorable ratings on all five of the factors examined. This suggests that both pants would be adequate replacements for the current dungaree pants. However, Pant B was rated higher more often than was Pant A. Pant B had significantly higher ratings in all areas of *fit preference, overall look of the design, design of the pant leg, comfort for in both cold environments and overall comfort*, and the final *overall rating*. As with the shirts, Pant B received significantly higher ratings than Pant A, in four out of the five categories. The only exception to this trend, was that Pant A received a higher rating for *ease of stenciling or attaching name tags*. This however, would appear less important to factors such as comfort, and fit preferences. Therefore, Pant B appears to be the higher rated pant.

## Phase 2 - Modified Commercial Uniforms

### Methodology

#### Design

A within-subject design was used to allow each subject to wear each uniform. By allowing each test participant to wear every uniform type, situational factors such as weather, job classification and geographic location were controlled.

#### Subjects

All three uniforms were originally issued to 1278 male and female subjects. Subjects were located on 15 ships and shore commands across the East and West Coast. The mean age of the subjects was 28.

#### Procedures

The test period was six months. The three test uniforms were worn in place of subjects' current dungaree uniform. The test uniforms were worn in rotation and were laundered as necessary. When one uniform was being laundered, another uniform was worn in its place. For example, if a subject began the test wearing *Uniform B*, he/she might have switched to *Uniform C* when *Uniform B* needed to be laundered. This procedure was repeated throughout the six month test.

Uniforms were initially issued based upon self-reported sizes. A shirt or pant was not issued until both the fitter and subject felt that the garments were the proper size. Subjects were also encouraged to tailor their pants, to optimize their fit. An issue sheet was completed for each subject, detailing their self-reported size, the sizes of the garments issued and demographic information. A sample of the issue sheet can be found in Appendix C. It should be noted that for the women's version of Pant C, the number of garments procured in each size was not sufficient to fit all female subjects properly. Consequently, in some instances an ideal fit could not be obtained.

The sailors were visited at the midpoint (3 months) and endpoint (6 months) of the wear test to complete a *Wear Test Questionnaire*. The questionnaire was the same for the mid- and endpoints. The mid- and endpoint data collections were used to determine how well the garments stood up over time, and to see if user preferences changed with continual use of the garments. The user questionnaires were designed to obtain information on: fit, design, utility, durability and comfort. Appendix D contains a sample survey.

## Questionnaires

*Fit and Preference* questionnaires were used to elicit test participants' opinions about the shirts and pants under study. The questionnaires were divided into five sections, each addressing the following factors: *fit, design and utility, durability, comfort* and *overall acceptance*.

The *Fit* section was constructed to identify those test participants who thought they were wearing the correct size garments and to characterize the fit of the garments. Self-report measures were used to determine proper fit and were used at the issue, mid- and endpoints. While self-report is not always the most accurate method of reporting, the *perception* of properly fitting garments was a critical starting point of the evaluation. If test participants did not feel the uniforms fit properly, then their opinions about other characteristics of the garments would likely be negatively influenced.

Fit was characterized by asking test participants to rate it along several dimensions. For example, *length* was rated as *too long, just right* or *too short*; *fit* was rated as being *close-fitting, regular fit* or *baggy*.

The *Design* and *Utility* sections measured the degree to which the design of the garments were acceptable to the wearers. Factors such as *suitability, ability to perform operational activities, ability to use pockets* and *ability to label garments* were rated for each garment under study.

The *Durability* section measured all durability problems that test participants encountered while wearing the garments. Respondents were asked to specify the types of problems and to identify all areas of each garment where durability problems occurred.

The *Comfort* section measured test participants' ratings of overall comfort and comfort in hot and cold environmental conditions for each garment under study.

## **Results**

### Demographics of Respondents

*Table 11* shows the number of surveys returned for each phase of the test. Five hundred and one subjects completed all three phases of the study. The difference in the number of respondents at each data collection point was the result of attrition of test participants (due to reassignment, illness, etc.), and of a difference of response rate at each data collection point (i.e., some subjects provided responses at only one of the data collections).

Researchers involved in similar survey work - where test items are initially issued and the experimenters return at a later date to conduct surveys - assume that they will encounter an attrition rate of approximately 50%. In this study (as in Phase I), because there were two data collections (and therefore, an additional chance for attrition) and the subjects who were used for

the final analysis had to have completed surveys at **both** the mid and end points, it was expected that this number would be lower than 50%.

In deed, the final group of subjects selected for analysis was approximately 39% of the original group. This is an acceptable attrition rate given the two data collections, and that the analysis included only those subjects who were present for both data collections.

TABLE 11

Returned Surveys

Survey Point	N
Issue	1278
Mid	839
End	714
All Phases	501

Demographic Information

As can be seen in Table 12 below, nearly 30% of all respondents were female. Over 33% of east Coast respondents were female, while slightly more than 26% of the from the West coast respondents were female.

TABLE 12

Surveys by Gender

	Male		Female	
	n	%	n	%
East Coast	164	66.7	82	33.3
West Coast	188	73.7	67	26.3
Overall	352	70.1	149	29.9

Responses By Ship and Shore Commands

The number of responses by location is presented in Table 13. Forty-nine percent of responses came from the East Coast and 50.9% from the West.

TABLE 13

## Number of Responses by Ship

Ship	Total Test Subjects	Responses	% of Total Respondents
Arctic	73	49	9.8
Boxer	74	50	10.0
Briscoe	75	38	7.6
Comstock	64	46	9.2
Constellation	56	26	5.2
Emory Land	84	41	8.2
Jacksonville	42	21	4.2
LaJolla	48	17	3.4
McKee	96	31	6.2
NAS-Norfolk	41	25	5.0
NAS-SD	102	24	4.8
SIMA-VA	81	36	7.2
SIMA-SD	152	62	12.4
VRC-40	76	15	3.0
Wasp	97	20	4.0

Age

The mean age of respondents was 27.65 (sd=5.85). The age of respondents were subjected to a two factor ANOVA, with gender and coast serving as between-subject factors. There were no significant differences found in the mean ages of respondents, regardless of gender or coast.

Ethnicity

Table 14 presents the ethnic background of test participants by coast. Two Kruskal-Wallis one-way analysis of variance were applied to the ethnographic data, with gender and coast serving as between-subject factors. Ethnic distribution was not significantly different between gender, but was significantly different between the East and West coasts ( $\chi^2 = 5.24$ ,  $df=1$ ,  $p<0.05$ ). Compared to the East coast, the West coast had a higher representation of Asian Pacific Islanders (n=5 and 37, respectively), and a slightly lower representation of both Afro-Americans (n=126) and Caucasians (n=261).

TABLE 14

## Number of Responses by Ethnicity

	East		West		Overall	
	n	%	n	%	n	%
American Indian	5	2.1	1	0.4	6	1.2
Asian / Pacific Islander	5	2.1	37	15.0	42	8.6
Afro-American	69	28.5	57	23.1	126	25.8
Hispanic	17	7.0	18	7.3	35	7.2
Mixed	7	2.9	12	4.9	19	3.9
Caucasian	139	57.4	122	49.4	261	53.4

Analysis of Shirt and Pants Data

As in Phase I, the analyses of the shirt and pants data were conducted separately, with each being subjected to approximately 20 different analyses. Due to the large numbers of comparisons being made, the *Bonferoni correction* was applied to all analyses. The Bonferoni correction reduces the chances of obtaining false positive results (i.e., saying there is a difference in the data, when there is actually no difference).

Adjusted Significance Level      = Alpha Level / Number of Analyses  
    = 0.05 / 20  
    = 0.0025

ShirtsFitting/Non-Fitting Subjects

Respondents were divided into two groups: those who reported that both shirt types fit (classified as *Fitting*), and those who reported that both shirts did not fit (*Non-Fitting*). The combined *fitting/non-fitting* data for both shirts were subjected to two Mann-Whitney U tests, with coast and gender serving as between-subjects factors. There were no significant differences in the number of test participants for whom Shirts A/B or C fit, regardless of gender or coast. *Table 15* presents the overall number of subjects classified as *fitting* or *non-fitting*.



TABLE 15

Number of Respondents Classified as "Fitting"

	n	%
Fitting	352	70.3
Non-Fitting	149	29.7

The *fitting/non-fitting* data for Shirt A/B and Shirt C, were subjected to a Wilcoxon Matched-Pairs Signed-Ranks test. Shirt C fit significantly more test participants than did Shirt A/B (83.8%, 76.6%, respectively) ( $Z=-3.13, p<0.01$ ). Table 16 displays the fit data for both shirts.

TABLE 16

Fit by Shirt

	Shirt A/B		Shirt C	
	n	%	n	%
Fitting	384	76.6	420	83.8
Non-Fitting	117	23.4	81	16.2

Table 17 presents data from *non-fitting* subjects, listing the reasons the shirts did not fit. At the midpoint data collection, the most common reason given for *both* shirts not fitting was that they were *too tight* (Shirt A/B = 69%, Shirt C = 79%). At the endpoint, this was still the most common reason given for Shirt A; however, equal numbers of respondents said Shirt C was either too tight (38%) or too loose (38%).

TABLE 17

Reasons Given for Non Fitting Subjects

	Midpoint				Endpoint			
	Shirt A/B		Shirt C		Shirt A/B		Shirt C	
	n	%	n	%	n	%	n	%
Too Tight	43	69.4	27	79.4	47	59.5	13	38.2
Too Loose	9	14.5	4	11.8	13	16.5	13	38.2
Other Reasons	10	16.1	3	8.8	19	24.1	8	23.5

Note: Ns do not sum to 149 because some subjects did not fit into all shirts.

### Fit of Shirts

Only subjects who responded that their shirts fit ( $n = 352$ ) were retained for the following analyses. All fit questions were subjected to split-plot ANOVAs, with garment type (Shirt A/B, Shirt C) and Data Collection Point (Midpoint, Endpoint) serving as within-subject variables, and gender and coast serving as between-subject variables.

No significant differences were found in the overall mean ratings of *shirt sleeve length* or *overall length* (Overall mean ratings for both shirts; Overall Length  $\bar{x} = 2.03$ , Sleeve Length  $\bar{x} = 1.98$ ) correspond to "Just Right" on the scale.

### Fit Description

The mean overall fit description ratings for both garments suggest test participants consider each area to be a *baggy fit*. The *description of fit* for the shoulders, chest, arms, neck, and stomach, follow the same pattern of response as the overall ratings.

### Acceptability of Fit

Table 18 lists the mean fit ratings for each shirt for each body area broken down by gender and coast.

*Overall:* Shirt C received an average rating of 4.09, while Shirt A/B received a mean rating of 3.85. This difference was significantly different ( $F = 29.37$  (1,341)  $p < 0.01$ ).

*Shoulders:* Mean ratings for the fit of the shoulders differed significantly ( $F = 25.73$  (1,339)  $p < 0.001$ ), with Shirt C receiving a higher average rating ( $\bar{x} = 3.88, 4.08$ , A/B and C, respectively).

*Chest:* Mean ratings for the fit of the chest differed significantly ( $F = 25.31$  (1,339)  $p < 0.001$ ), with Shirt C receiving the higher rating ( $\bar{x} = 3.89, 4.10$ , A/B and C, respectively).

*Arms:* Mean ratings for the fit of the arms differed significantly ( $F = 27.86$  (1,340)  $p < 0.001$ ), with Shirt C receiving a higher rating ( $\bar{x} = 3.80, 4.02$ , A/B and C, respectively).

*Neck:* Mean ratings for the fit of the neck differed significantly ( $F = 30.32$  (1,340)  $p < 0.001$ ), with Shirt C receiving the higher rating ( $\bar{x} = 3.88, 4.09$ , A/B and C, respectively).

*Stomach:* Mean ratings for the fit of the stomach differed significantly ( $F = 30.95$  (1,339)  $p < 0.001$ ), with Shirt C receiving the higher rating ( $\bar{x} = 3.85, 4.11$  A/B and C, respectively).

**Scale:**

Dislike Very Much 1	Dislike Moderately 2	Neither Like nor Dislike 3	Like Moderately 4	Like Very Much 5
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TABLE 18

**Mean Fit Ratings for Shirts**

Gender	Midpoint				Endpoint			
	Shirt A/B		Shirt C		Shirt A/B		Shirt C	
	M	F	M	F	M	F	M	F
	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$
Overall Fit	3.98	3.79	4.10	4.28	3.82	3.68	4.02	4.08
Shoulders	4.02	3.79	4.10	4.24	3.84	3.70	3.99	4.12
Chest	4.04	3.82	4.13	4.28	3.86	3.66	4.00	4.09
Arms	3.91	3.76	4.03	4.19	3.77	3.59	3.95	4.00
Neck	4.01	3.85	4.08	4.25	3.82	3.72	4.03	4.15
Stomach	3.97	3.75	4.10	4.20	3.84	3.68	4.01	4.13

**Design of Shirts**

Unless otherwise stated, all design questions were subjected to split-plot ANOVAs, with garment type (Shirt A/B, Shirt C) and Data Collection Point (Midpoint, Endpoint) serving as within-subject variables, and gender and coast serving as between-subject variables.

*Overall Look:* The overall mean ratings differed significantly by data collection point ( $F = 21.53 (1,342) p < 0.001$ ). The endpoint ratings were lower than the midpoint ( $\bar{x} = 4.32, 4.09$ , midpoint and endpoint, respectively). The mean ratings for the shirts did not differ significantly ( $\bar{x} = 4.18, 4.23$  Shirt A/B and C, respectively).

*Restriction in Activities:* Table 19 displays subject responses to whether they could perform all their daily activities. Two Wilcoxon Matched-Pairs Signed Rank tests were applied to both the midpoint and endpoint data collections. Over 93% of subjects stated they had no restrictions to their activities as a result of wearing the shirts. The distribution of "Yes" and "No" responses did not change significantly for shirts between data collection points.

*Suitability to Job:* Table 19 displays subject responses to whether the shirts were suitable to their

particular jobs (i.e., designed acceptably to perform duties). Over 87% of the subjects responded that the shirts were *suited* to their work. Two Wilcoxon Matched-Pairs Signed Rank tests were applied to both the midpoint and endpoint data collections. The distribution of "Yes" and "No" responses was not significantly different between the shirts.

TABLE 19

Design of Uniforms: Restriction in Activities, and Suitability

	Shirt A/B				Shirt C			
	Mid		End		Mid		End	
	Yes	No	Yes	No	Yes	No	Yes	No
Restriction (%)	96.0	4.0	93.9	6.1	94.3	5.7	94.3	5.7
Suitability (%)	89.9	10.1	89.9	10.1	88.3	11.7	87.4	12.6

*Pockets:* Mean ratings for the ease of use of the front pockets ( $\bar{x}$  = 4.18, 4.23, for Shirts A/B and C, respectively) were not significantly different. The mean ratings correspond to the pockets being *Fairly Easy* to use.

#### Durability

*Frequency of Wear:* The average total wear time (days) for each shirt varied significantly by garment ( $F = 10.72$  (1,270)  $p < 0.002$ ). Shirt A/B was worn an average of 8 days longer ( $\bar{x}$  = 52.52 days, 46.30 days) than was Shirt C. Wear time also differed significantly by gender: males wore the shirts an average of 9 days longer than did the females ( $\bar{x}$  = Males 51.87 days, Females 42.38 days).

*Durability:* The mean durability rating varied by garment type ( $F = 37.38$  (1,328)  $p < 0.001$ ). Ratings for Shirt C were higher than those for Shirt A/B ( $\bar{x}$  = 2.91, 3.15 Shirts A and C, respectively). Both mean ratings correspond to *Durable* on the verbal rating scale.

*Ease of Care:* Mean ratings for the *ease of care after laundering* differed significantly by garment ( $F = 418.55$  (1,336)  $p < 0.001$ ), Shirt C's mean rating was much greater than that of Shirt A/B ( $\bar{x}$  = 2.28, 3.91, Shirts A/B and C, respectively). The mean rating for Shirt A/B suggests that it maintained its appearance *Poorly*; in comparison, the average rating for Shirt C suggests that it maintained its appearance *Well*.

*Laundering Frequency:* The mean frequency with which Shirts A and C ( $\bar{x}$  = 4.13, 4.20, respectively) were laundered were not significantly different.

## Comfort

Table 20 presents the mean ratings of three levels of comfort: overall, in hot conditions and in cold conditions.

Scale:

Very Uncomfortable	Uncomfortable	Acceptable	Comfortable	Very Comfortable
1	2	3	4	5

TABLE 20

Mean Comfort Ratings

Conditions	Shirt A/B		Shirt C	
	Mid	End	Mid	End
	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$
Hot	2.90	2.55	3.38	3.18
Cold	3.85	3.65	3.69	3.63
Overall	3.48	3.22	3.63	3.52

*Hot Conditions:* The average rating for comfort in hot conditions for Shirt C ( $\bar{x}$  = 3.28) was significantly higher than that received by Shirt A/B ( $\bar{x}$  = 2.73),  $F = 78.44$  (1,329)  $p < 0.001$ . Overall, ratings were higher at the midpoint than at the endpoint,  $F = 24.42$  (1,329)  $p < 0.001$  ( $\bar{x}$  = 3.14, 2.87 mid- and endpoint, respectively).

*Cold Conditions:* Mean ratings for comfort in cold conditions did not differ significantly.

*Overall:* Mean ratings for comfort differed significantly by shirt type ( $F = 23.89$  (1,328)  $p < 0.001$ ). Shirt A's mean rating was slightly lower than that of Shirt C ( $\bar{x}$  = 3.34, 3.58, respectively). Mean comfort ratings also differed by data collection point ( $F = 15.30$  (1,328)  $p < 0.001$ ): ratings at the midpoint were higher than those for the endpoint ( $\bar{x}$  = 3.56, 3.37 mid- and endpoint, respectively). All ratings were in the positive end of the scale and fell between *Acceptable* and *Comfortable*.

## Overall

The mean overall ratings for each shirt are presented in Table 21.

Scale:

Very Poor 1	Poor 2	Fair 3	Good 4	Very Good 5
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TABLE 21

Overall Shirt Ratings

	Shirt A/B		Shirt C	
	Male	Female	Male	Female
	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$
Overall	3.29	2.80	3.87	4.01

The mean overall ratings for each shirt were significantly different ( $F = 136.47$  (1,340)  $p < 0.001$ ). The mean rating for Shirt A/B was lower than the mean rating for Shirt C ( $\bar{x} = 3.16$ , 3.91, respectively). Shirt A/B, was on average, rated as being *Fair*, while Shirt C was rated as being *Good*. In addition, men rated Shirt A/B more favorably than did females, but females rated Shirt C *more* favorably than did males ( $F = 16.71$  (1,340)  $p < 0.001$ ).

Comparison

Subjects were asked to rank each of the garments along four factors: fit, comfort, durability, and appearance. Table 22 presents the frequencies of these ranks for each garment, broken out by gender and data collection point.

TABLE 22

Frequencies of Shirt Number 1 Rankings

%	Shirt A/B			Shirt C		
	M	F	All	M	F	All
<b>Midpoint</b>						
Fit	68.9	51.1	63.9	66.5	78.5	69.9
Comfort	69.2	52.1	64.4	62.4	77.4	66.7
Durability	60.9	45.2	56.4	72.6	77.7	74.0
Appearance	45.4	19.4	38.1	70.6	83.0	74.1
<b>Endpoint</b>						
Fit	66.9	46.7	61.4	64.4	81.3	68.9
Comfort	63.0	48.4	58.9	66.1	79.1	69.6
Durability	58.9	37.0	53.0	70.6	80.2	73.2
Appearance	40.8	25.8	36.7	71.5	84.9	75.1

The rank data were subjected to Wilcoxon Matched-Pairs Signed-Ranks test for each category. For the midpoint data, the rank distributions for each shirt were significantly different for durability and appearance ( $Z = -3.65, -6.43$ , respectively  $p < 0.001$ ). In both cases, Shirt C received significantly more top ranks than did Shirt A, especially for the appearance category. The endpoint rank distributions also differed significantly for durability and appearance ( $Z = -3.92, -6.87$ , respectively  $p < 0.001$ ), with shirt C receiving more top ratings.

#### Comparison to Current Chambray Shirt

Table 23 displays the mean ratings of comparison for subjects' favorite shirt (i.e., top-ranked shirt) to the current chambray shirt. The mean ratings did not vary between gender, coast or data collection for any of the four areas. All mean ratings fell between *Like Current the Same* as the study uniforms and *Like Current More* than the study uniforms.

Scale:

Like Current Much Less 1	Like Current Less 2	Like Current Same 3	Like Current More 4	Like Current Much More 5
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TABLE 23  
Mean Comparison Ratings

	Mid	End
	$\bar{x}$	$\bar{x}$
Fit of Shirts	3.15	3.10
Comfort	3.15	3.13
Durability	3.20	3.03
Appearance	3.20	3.10

Table 24 lists the frequencies for the comparison data for the endpoint data collection.

TABLE 24  
Overall Comparison Ratings - Percentage of Responses Per Ranking

Rank	1	2	3	4	5
Fit of shirts	14.2	14.2	37.9	14.8	18.8
Comfort	14.2	15.4	33.9	16.8	19.7
Durability	16.5	18.2	30.5	15.1	19.7
Appearance	17.9	16.2	26.8	15.1	23.4

In all cases the number of subjects liking the old shirt better is greater than the number of subjects liking the new.

## **Pants**

### **Fitting/Non-Fitting Subjects**

Respondents were divided into two groups: those who reported that all three pant types fit (classified as *fitting*), and those who reported that any of the three pants did not fit (*non-fitting*). Table 25 displays the number of subjects classified in the *fitting* group.

TABLE 25

Number of Respondents Classified as "Fitting"

	n	%
Fitting	297	59.3
Non-Fitting	204	40.7

The *fitting/non-fitting* data for Pants A, B, and C were subjected to a Friedman ANOVA. The distribution of *fitting* and *non-fitting* subjects for each pair of pants was not significantly different.

The overall *fitting/non-fitting* data were subjected to two Mann-Whitney U tests, with coast and gender serving as between-subject factors. The number of *fitting* subjects to *non-fitting* subjects did not differ significantly between coasts; however a significant difference was found between males and females ( $Z=-6.42, p<0.01$ ). Table 26 lists the fit responses for males and females. Over 68% of male subjects responded that all three pants fit, whereas only slightly more than 37% of the female subjects indicated that all three pants fit.

TABLE 26

Pant "Fit" / "No-Fit" by Gender

	Male		Female	
	n	%	n	%
Fitting	241	68.5	56	37.6
Non-Fitting	111	31.5	93	62.4



Table 27 displays the percentages of males and females who fit into each of the three pant types. For all three pairs of pants, female subjects had a lower percentage of "fit" responses. This was especially true of Pant C, with almost 50% of female subjects stating the pants did not fit.

Fit data for each pair of pants were subjected to a Mann-Whitney U Test, with gender serving as a between-subjects factor. The distribution of *fit/ non-fit* responses between male and female subjects were significantly different for each pant ( $Z=-3.07, p<0.01$ ;  $Z=-2.26, p<0.05$ ;  $Z=-6.09, p<0.01$ ; for Pants A, B, and C, respectively).

TABLE 27

"Fit" / "No-Fit" by Pant by Gender

	Pant A				Pant B				Pant C			
	Male		Female		Male		Female		Male		Female	
	n	%	n	%	n	%	n	%	n	%	n	%
Fitting	293	83.2	106	71.1	289	82.1	109	73.2	281	79.8	79	53.0
Non-Fitting	59	16.8	43	28.9	63	17.9	40	26.8	71	20.2	70	47.0

Tables 28 and 29 list the reasons provided by the subjects for the pants not fitting. For Pants A and B, nearly 60% of all *non-fitters* indicated the pants were *too tight*. The same reason was given by the males for Pant C; however, 59.2% of the females reported that the pants did not fit because they are *too loose*. This pattern occurred at both the mid- and endpoints, and is likely due to the insufficient number of pants available in each size (as discussed earlier).

TABLE 28

Reasons for "Non-Fitting" Responses - Midpoint

	Pant A				Pant B				Pant C			
	Male		Female		Male		Female		Male		Female	
	n	%	n	%	n	%	n	%	n	%	n	%
Too Tight	25	61.0	16	64.0	20	64.5	11	57.9	22	55.0	11	22.4
Too Loose	12	29.3	5	20.0	9	29.0	4	21.1	11	27.5	29	59.2
Other Reasons	4	9.8	4	16.0	2	6.5	4	21.1	7	17.5	9	18.4

TABLE 29

Reasons for "Non-Fitting" Responses - Endpoint

	Pant A				Pant B				Pant C			
	Male		Female		Male		Female		Male		Female	
	n	%	n	%	n	%	n	%	n	%	n	%
Too Tight	20	62.5	16	61.5	21	67.7	16	66.7	13	46.4	11	21.6
Too Loose	9	28.1	5	19.2	7	22.6	4	16.7	11	39.3	30	58.8
Other Reasons	3	9.4	5	19.2	3	9.7	4	16.7	4	14.3	10	19.6

The *fit/non-fit* data were subjected to four two-factor split-plot ANOVAs, with size (*self-reported size, issued size*) serving as within-subject factors, and fit (*fitting, non-fitting*) serving as between-subject factors. Table 30 presents self-reported sizes and issued sizes for each pant.

For all pants, there was no difference between self-reported and actual sizes issued for either the *fitting* and *non-fitting* test participants.

Overall, for Pants A and B, the size differed significantly between self-reported size and issued pant size. For males, the issued waist size was approximately 0.2" greater than that which was reported. For females, the issued size was approximately one (1) size greater than the reported size. For Pant C, male self-reported sizes did not differ significantly from those issued; whereas, the female self-reported size did differ significantly from the issued size ( $F=63.47$  (1,132),  $p<0.001$ ) where the issued size was two sizes smaller than the self-reported size ( $\bar{x}=14.8, 13.1$ ; self-reported and issue, respectively).

TABLE 30

Self Reported Sizes and Issued Sizes

	Self		Pant A		Pant B		Pant C	
	$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd
Male Size	33.8	3.0	33.9	3.1	34.0	3.1	34.0	3.3
Female Size	14.8	2.9	15.8	3.1	15.6	3.2	13.1	2.8

In order to understand the differences in fit among female test participants more fully, ethnicity was included in the analysis. Female ethnographic data were subjected to a Mann-Whitney U test with fit of Pant C serving as a between-subjects factor. There were no differences in race distribution between *fitting* subjects and *non-fitting* subjects.

A tally of comments for the fit of Pant C was produced for *non-fitting* female subjects. Twenty-four subjects provided comments; they are displayed in Table 31.

TABLE 31

Female Comments for "Non-Fitting" of Pant C

n=24	n
Crotch too Loose/Long	8
Waist Tight / Hips Loose	4
Size too Large	4
Ill Fitting	2
Baggy	1
Waist Tight	1
Seat	1
Hip and Seat Large	1
Hips too Baggy	1
Too Short	1

### Fit of Pants

Only the subjects who reported that the three pants fit (n=297) were retained for the following analyses. Fit was assessed along three factors: length of pants, fit at specific body areas and preference rating of fit at specific body areas. All fit questions were subjected to split-plot ANOVA, with garment type (Pant A, Pant B, Pant C) and Data Collection Point (Midpoint, Endpoint) serving as within-subject variables, and gender and coast serving as between-subject variables.

Scale:	Close	Regular	Baggy
	Fit	Fit	Fit
	1	2	3

### Length

*Overall Length:* All ratings of pant length were positive, as evidenced by an overall mean rating of 2.0. However, the overall pant length ratings varied significantly between gender ( $F=56.09$  (1,277)  $p<0.001$ ) and data collection point ( $F=12.53$  (1,277)  $p<0.001$ ). There was an increased number of West Coast female subjects who rated the pants as *Too Long* at the Midpoint collection compared to the endpoint data collection.

*Crotch Length:* There was no overall difference in mean crotch length ratings among the three pant types. However, there was a significant difference found between male and female

ratings. The mean crotch length rating for females was slightly higher than for males ( $\bar{x}$ =2.20, 2.00, respectively). Both ratings, however, correspond to *Just Right*, with the female mean rating suggesting that slightly more females rated the pants as *Too Long* than males.

### Fit Description

Table 32 presents the means for all description of fit questions broken down by gender.

**Overall Fit:** Mean overall fit description ratings differed significantly by garment type ( $F=27.39$  (2,558)  $p<0.001$ ). The mean rating for Pant C ( $\bar{x} = 2.07$ ) was greater than either Pant A or B ( $\bar{x} = 2.01, 2.00$ , respectively). This difference, while *statistically significant*, was so small that it has little practical meaning. In addition, females tended to rate Pant C as being *baggy* more often than did males  $F=13.59$  (2,558)  $p<0.001$ . ( $\bar{x} = 2.22$ ).

**Waist:** No significant differences were found among the mean description ratings of fit for the waist area for the three pant types.

**Seat Area:** A significant difference was found in the mean ratings for the seat area for the three pants ( $F=17.55$  (2,558)  $p<0.001$ ). Pant C's mean rating was higher ( $\bar{x} = 2.06$ ) than those for Pants A or B ( $\bar{x} = 1.98$  and  $1.99$ , respectively). The high mean female rating for Pant C ( $\bar{x} = 2.22$ ), indicates more female subjects found the seat area to be a *baggy fit*, rather than *regular fit* ( $F=13.59$  (2,558)  $p<0.001$ ).

**Thigh:** The mean ratings for the thigh area differed significantly by garment ( $F=21.21$  (df=2,554)  $p<0.001$ ). Pant C's rating was higher ( $\bar{x} = 2.04$ ) than those for Pants A or B ( $\bar{x} = 1.97$  and  $1.98$ , respectively). In addition, the females tended to rate Pant C as being *baggy* more often than did the males  $F=12.48$  (2,554)  $p<0.001$  ( $\bar{x} = 2.15$ ).

Scale:	Close	Regular	Baggy
	Fit	Fit	Fit
	1	2	3

TABLE 32

Mean Description of Fit Ratings

	Pant A		Pant B		Pant C	
	Male	Female	Male	Female	Male	Female
	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$
Overall Fit	2.00	2.02	2.00	2.00	2.04	2.22
Waist	1.98	2.06	2.00	2.05	1.99	2.02
Seat Area	1.98	2.01	1.98	2.01	2.02	2.21
Thigh	1.98	1.93	1.98	1.93	2.02	2.15

### *Rating of Fit*

*Overall Fit:* Mean ratings of overall fit differed significantly by data collection ( $F = 13.04$  (1,287)  $p < 0.001$ ), with the midpoint having higher ratings than the endpoint ( $\bar{x} = 4.24, 4.09$ , respectively).

*Waist:* No differences were found in the mean overall ratings for *fit of the waist* among the three types of pants. However, ratings differed significantly by data collection ( $F = 21.75$  (1,285)  $p < 0.001$ ). Test participants rated all three pants lower at the endpoint than they did at the midpoint ( $\bar{x} = 4.04, 4.20$ , respectively). In general, females rated the fit of the waist lower than did men. In addition, females rated the fit of the waist lower at the endpoint ( $\bar{x} = 3.67$ ) than at the midpoint ( $\bar{x} = 4.19$ ),  $F = 12.56$  (1,285)  $p < 0.001$ .

*Seat Area:* No differences were found in mean overall ratings of the *seat area* among the three types of pants. However, ratings differed significantly by data collection ( $F = 11.36$  (1,285)  $p < 0.001$ ): the endpoint had a lower rating than the midpoint collection ( $\bar{x} = 4.07, 4.22$ , respectively).

*Thigh:* No differences were found in the mean overall ratings for the *thigh* among the three types of pants. However, the garment by gender interaction was significant ( $F = 6.93$  (2,570)  $P < 0.002$ ), where the male preference score was lower for Pant C than for Pants A and B, whereas the female mean score is higher for Pant C than for Pants A and B (Male  $\bar{x} = 4.24, 4.29, 4.04$  for Pants A, B, and C respectively; Female  $\bar{x} = 3.92, 3.90, 4.09$ ).

### *Design of Pants*

Unless otherwise stated, all design questions were subjected to split-plot ANOVAs, with garment type (Pant A, Pant B, Pant C) and Data Collection Point (midpoint, endpoint) serving as within-subject variables, and gender and coast serving as between-subject variables.

*Overall Look:* There were no significant differences among the mean overall ratings for the *overall look* of the pants. However, the males rated Pants A and B ( $\bar{x} = 4.20, 4.30$ , respectively) significantly higher than they did Pant C ( $\bar{x} = 3.91$ ). In comparison, females rated Pant C ( $\bar{x} = 4.15$ ) higher than they did Pants A or B ( $\bar{x} = 3.95, 3.96$ , respectively). This suggests that males and females had opposite opinions about the overall look of the pants: females preferred Pant C over Pants A and B, while the males preferred the look of Pants A and B over C. These differences, although statistically significant, were slight and fell into the range of *Like moderately*.

*Design of the Pant Legs:* There was no difference among the mean ratings for the look of the pant legs for all three pant types ( $\bar{x} = 4.25, 4.30, 4.17$  for Pants A, B, and C, respectively).

*Ability to Stencil Name Tags:* Table 33 displays subject responses to whether they could easily stencil or attach their name tag to each pair of pants. Two Friedman two-way ANOVAs were applied to the mid- and endpoint data. There was no difference found among the three types of pants in subjects' ability to attach their names to the pants. This was true for both data collection points.

*Restriction in Activities:* Subjects were asked to indicate whether or not the pants restricted their ability to perform their mission-related activities. These data are reported below in Table 33. Over 94% of subjects stated they could perform all their daily activities. Those who reported they could not, cited fit problems as the reason for the impediment. Two Friedman two-way ANOVAs were applied to both the mid- and endpoint data. The distribution of *Yes* and *No* responses did not change significantly for any pant type.

*Suitability to Job:* Table 33 displays subject responses to whether the pants were suitable to their particular job. Over 91% of the subjects responded that the pants are "suited" to their work. Two Friedman two-way ANOVAs were applied to both the mid- and endpoint data. The distribution of *Yes* and *No* responses did not change significantly between pant or data collection.

TABLE 33

Design of Uniforms: Ability to Stencil, Restriction in Activities, and Suitability

	Pant A				Pant B				Pant C			
	Mid		End		Mid		End		Mid		End	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Stencil (%)	83.3	16.7	81.3	18.7	81.9	18.1	79.2	20.8	95.1	4.9	95.2	4.8
Restriction (%)	95.9	4.1	96.9	3.1	96.2	3.8	97.3	2.7	94.8	6.2	96.9	3.1
Suitability (%)	95.5	4.5	95.9	4.1	96.9	3.1	96.6	3.4	92.2	7.8	91.5	8.5

*Front Pockets:* Mean ratings for the ease of use of the front pockets ( $\bar{x}$  = 4.30, 4.34, 4.33 for Pant A, B, and C, respectively) were not significantly different. The numerical mean ratings correspond to the verbal label *Fairly Easy* to use.

*Rear Pockets:* Mean ratings for the ease of use of the rear pockets ( $\bar{x}$  = 4.33, 4.33, 4.32 for Pant A, B, and C respectively) were not significantly different. The numerical mean ratings correspond to the verbal label *Fairly Easy* to use.

### Durability

*Frequency of Wear:* The total wear time (days) for each pant did not vary significantly among the pant types ( $\bar{x}$  = 52.1, 52.80, 46.55 for Pants A, B and C, respectively).

*Durability:* There were no differences found in ratings of durability among the three pant types. However, the garment by gender interaction term was significant ( $F = 7.91$  (2,544)  $p < 0.001$ ). That is, men's preference scores were lower for Pant C compared to those of the females (Males  $\bar{x}$  = 3.32, 3.36, 3.22 for Pant A, B, and C respectively; Females  $\bar{x}$  = 3.06, 3.17, 3.31). These results suggest that, on average, male subjects viewed Pants A and B as being more durable, while the females viewed Pant C as more durable. All numerical mean scores, however, correspond to the verbal label *durable*.

*Ease of Care:* Mean ratings for the ease of care after laundering differed significantly by garment ( $F = 50.11$  (2,558)  $p < 0.001$ ). Pant C received a higher rating than did Pants A or B ( $\bar{x}$  = 3.63, 3.66, and 3.95). Overall, Pant C was viewed as maintaining its appearance *well* after laundering; while on average, the other two pants were viewed as maintaining their appearance between *OK* and *Well*. There was, however, a significant interaction between gender and garment type ( $F = 19.04$  (2,558)  $p < 0.001$ ). That is, the mean female score was lower than that of the males for Pants A and B ( $\bar{x}$  = 3.25, 3.38, respectively); however, the mean female score for Pant C was higher than that of the males ( $\bar{x}$  Male = 3.91,  $\bar{x}$  Female = 4.13).

*Laundering Frequency:* There was no difference in the frequency with which subjects laundered the three types of pants.

*Use of Shipboard Laundering:* Table 34 presents subjects' estimates of the frequency with which the garments were shipboard laundered. Over 50% of subjects never shipboard laundered their pants.

TABLE 34

Percentage of Time Garments Shipboard Laundered

	100%	75%	66%	50%	25%	Never
	%	%	%	%	%	%
Midpoint	10.1	7.6	4.7	10.1	7.9	59.7
Endpoint	14.1	5.8	4.7	11.6	7.2	56.7

## Comfort

Table 35 presents the mean ratings of comfort - *overall* and in *hot and cold conditions*

Scale:  
 Very Uncomfortable 1      Uncomfortable 2      Acceptable 3      Comfortable 4      Very Comfortable 5

TABLE 35

Mean Comfort Ratings

	Pant A		Pant B		Pant C	
	Male	Female	Male	Female	Male	Female
Conditions	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$
Hot	3.58	3.34	3.58	3.25	3.55	3.75
Cold	3.87	3.62	3.95	3.79	3.55	3.77
Overall	3.82	3.62	3.82	3.64	3.63	3.85

*Hot Conditions:* Mean ratings for comfort differed significantly by garment ( $F = 6.17$  (2,544)  $p < 0.0025$ ). Pant C received a higher average rating than did Pant A, and Pant A received a higher average rating than Pant B ( $\bar{x} = 3.54, 3.51$ , and  $3.59$ , respectively). Mean comfort ratings also differed by data collection ( $F = 16.67$  (1,272)  $p < 0.001$ ). The endpoint collection was lower than the midpoint ( $\bar{x} = 3.65, 3.45$  mid- and endpoint, respectively). There was also a significant interaction between gender and garment type ( $F = 8.03$  (2,544)  $p < 0.001$ ). That is, females rated Pants A and B lower than did males ( $\bar{x} = 3.34, 3.25$  respectively), but they rated Pant C higher than did the males ( $\bar{x}$  Male =  $3.55$ ,  $\bar{x}$  Female =  $3.75$ ).

*Cold Conditions:* Mean ratings for comfort for all three pants did not differ significantly. There was, however, a significant interaction between gender and garment type ( $F = 8.03$  (2,544)  $p < 0.001$ ). Specifically, males rated Pant C significantly lower than did females.

*Overall:* Mean ratings for overall comfort did not differ significantly among the three pant types. However, females rated Pants A and B lower, and Pant C higher than did males ( $F = 8.56$  (2,544)  $p < 0.001$ ). In addition, the mean ratings for Pants A and B decreased by an average of 0.2 scale points from the midpoint to the endpoint, while the mean rating for Pant C decreased by only 0.05 scale points. These differences were significant ( $F = 8.32$  (2,544)  $p < 0.001$ ).



### Overall

The mean overall ratings for each garment are presented in Table 36

Scale:

Very Poor	Poor	Fair	Good	Very Good
1	2	3	4	5

TABLE 36

Overall Pant Ratings

	Pant A		Pant B		Pant C	
	Male	Female	Male	Female	Male	Female
	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$
Overall	4.13	3.76	4.19	3.87	3.94	4.24

Mean overall ratings did not differ significantly, and were all around the rating of *good*. However, the interaction term gender by garment was, significant ( $F = 14.66$  (2,558)  $P < 0.001$ ). That is, males rated Pants A and B higher than females, but rated Pant C lower than females (male  $\bar{x} = 4.13, 4.19$ , and  $3.94$ , respectively; female  $\bar{x} = 3.76, 3.87$ , and  $4.24$ , respectively).

### Comparison

Subjects were asked to rank each of the garments along four factors: fit of pants, comfort of pants, durability of pants, and appearance of pants. Table 37 presents frequencies of rank for each garment, broken out by gender and data collection.

TABLE 37

## Frequencies of Pant Number 1 Rankings

%	Pant A			Pant B			Pant C		
	M	F	All	M	F	All	M	F	All
<b>Midpoint</b>									
Fit	68.1	49.1	64.5	64.7	47.3	61.3	52.2	64.8	54.5
Comfort	70.6	48.1	66.3	65.4	42.6	61.1	49.1	64.2	51.9
Durability	68.7	51.9	65.5	71.2	46.3	66.4	47.8	69.8	51.9
Appearance	60.9	43.4	57.7	61.2	41.5	57.5	53.4	65.4	55.6
<b>Endpoint</b>									
Fit	66.0	45.5	62.1	57.9	38.3	54.3	51.7	72.7	55.8
Comfort	63.7	47.3	60.6	59.0	37.5	54.8	50.2	78.2	55.6
Durability	64.5	38.2	59.5	64.5	40.0	59.9	54.3	76.4	58.6
Appearance	59.6	42.6	56.4	57.0	43.6	54.5	56.8	77.8	60.8

The rank data were subjected to Friedman ANOVAs. For the midpoint, the rank distribution for each pant were significantly different for *fit*, *comfort*, and *durability* ( $\chi^2 = 13.27$ , 15.55, and 16.08, respectively ( $df = 2$ )  $p < 0.002$ ). Pant A received the top ranks for the *fit* and *comfort*; Pant B received the most top ranks for *durability*. Rank distributions were not significantly different for *appearance*.

Comparison to Dungaree Uniform

Table 38 lists the mean ratings for comparing subjects' favorite candidate pant to the current dungaree uniform in four areas. The ratings between the mid- and endpoints were not significantly different. All ratings fell between *Like Current* *Less* than the most liked candidate pant. These results, however, were more dramatic when the frequencies of responses are considered. Table 39 lists the frequencies for the endpoint data collection.

**Scale:**

Like Current Much Less 1	Like Current Less 2	Like Current Same 3	Like Current More 4	Like Current Much More 5
--------------------------------	---------------------------	---------------------------	---------------------------	--------------------------------

TABLE 38

Mean Comparison Rating

	Mid	End
	$\bar{x}$	$\bar{x}$
Fit of Pants	2.71	2.57
Comfort	2.80	2.59
Durability	2.77	2.61
Appearance	2.80	2.53

The ratings between the mid- and endpoints were not significantly different. All are between *Like Current Less* than the most liked test pant. These results, however, are more dramatic when the frequencies of responses are viewed. Table 39 lists the frequencies for the endpoint data collection.

TABLE 39

Overall Pant Ratings

Rank	1	2	3	4	5
Fit of Pants	37.5	15.2	16.9	10.1	20.3
Comfort	36.5	16.9	16.2	8.8	21.6
Durability	35.8	14.5	19.6	10.1	19.9
Appearance	41.2	14.9	13.2	8.4	22.3

These data suggest that for all criteria, over 50% of the subjects preferred the candidate pants over than the current. This could be any of the three candidate pants, as the question asked subjects to compare their *most favored (candidate) pant* to the current dungarees. Approximately 30% of subjects favored the current dungaree uniforms for each criteria. The remaining 20% stated they liked both the candidate and current pants equally.

### General Questions

Test participants were asked whether or not they wanted the current *bell bottom* pants retained in the system, and if they desired a prescribed method of rolling their shirt sleeves. All subjects (n=501) were included in the analyses. Table 40 lists the frequencies of response for both questions.

TABLE 40

Frequencies of Response

	Midpoint		Endpoint	
	% YES	% NO	% YES	% NO
Retain Bell Bottoms	20.2	79.7	21.6	78.4
Prescribed Sleeve Roll	57.0	43.0	61.2	38.8

Over 78% of the subjects responded that they did not want to retain the bell bottoms. Both the midpoint and endpoint data were subjected to Chi squared analyses. The number of *Yes* versus *No* responses was significantly different for both data points ( $\chi^2(1) = 818.77, 150.37$  mid- and endpoints respectively  $p < 0.001$ ). This indicates that at both data collections significantly more subjects stated that the bell bottoms should not be retained.

Fifty-seven percent of subjects at the midpoint and 61% of subjects at the endpoint were in favor of a prescribed method of rolling their shirt sleeves. The number of *Yes* and *No* at both data points were significantly different ( $\chi^2(1) = 9.19, 24.50$  for the mid- and endpoints respectively  $p < 0.0025$ ). This suggests that significantly more subjects were in favor of a prescribed method of rolling the sleeves than were not.

### **Further Analyses**

Several further analyses were carried out on selected key portions of the data. Age was added as a covariate to the four factor ANOVA design used for the shirt and pant analyses. Adding age as a covariate to these analyses was done to determine whether any significant differences between means could have been explained by age. The analyses were run for *overall fit preference, design rating, overall comfort, and overall rating*. There was no systematic affects of age upon the results.

In an effort to distinguish which pants male subjects preferred at the end of the study, the ANOVA design was simplified by removing the female test participants from the analysis. A one factor within-subjects ANOVA, with garment serving as the within subjects factors was conducted on endpoint data for *overall fit preference ratings and the overall rating*.

TABLE 41

## Overall Pant Ratings

		Pant A	Pant B	Pant C
		$\bar{x}$	$\bar{x}$	$\bar{x}$
Overall Fit	(1=Dislike Very Much, 5=Like Very Much)	4.18	4.18	4.01
Overall Ratings	(1=Very Poor, 5=Very Good)	4.07	4.12	3.87

Table 41 lists the mean rating scores for *overall fit preference* and *overall rating* for each pair of pants. No significant differences were found between the ratings for any of the pants for either overall fit or overall rating. Thus, when the males are considered alone, at the last data collection point, there is no difference among any of the pants.

## Discussion - Phase II

From the initial issue of 1278 uniforms, 501 subjects completed surveys from all three phases. The East and West Coast ships both returned approximately 50% of the surveys. Thirty percent of the surveys were returned by female sailors. The returned surveys do not appear to be biased to any one coast, or to either male or female populations, given that uniforms were only issued to 354 females (28% of the issue population). Ethnographic background of participants appears to be an accurate representation of the overall Navy population. Thus, the subject pool used in the analyses appears to be representative of the general Navy population. This fact enables a fairly confident extrapolation of the findings from this subject pool to the entire Navy.

### Shirts

It was important in the analyses to distinguish between subject's whose shirts fit and, those who were issued shirts but found that they did not fit. Subjects with "non-fitting" shirts were dropped from the analysis as it would have been impossible to tell if their ratings and opinions were due to the shirt or the fact that the shirt did not fit. These data would confound any true differences or preferences amongst the shirts. Seventy percent of the subjects had two shirts that fit. The remaining 30% of the subjects either had one shirt, or both which did not fit. This fit rate should be compared to that of the current chambray shirt to assess whether they are different.

In many instances, mean ratings were found to be significantly different, even after adjusting the alpha level. The statistics often had enough power to distinguish between tenths of scale points. This level of distinction is too fine to lead to *practical* differences between shirts. Thus, it becomes necessary to define what is a practical difference. In most cases, one quarter of a scale point will be considered a practical difference. That is, when two mean ratings are different by more than 0.25 scale points, the difference will show a real tendency of subjects to prefer one garment or attribute of a garment over the other. Differences which were smaller than this will not be explained in any depth in the discussion that follows since they hold little practical importance.

The five main areas of the survey will be discussed separately.

### Fit of Shirt

The fit of the shoulders, chest, arms, neck, stomach, and overall-fit of the shirts were on average, described as *Regular*. Mean ratings for the *like* or *dislike of the fit* were all positive and in general, fell around the *Like Moderately* rating point. Shirt C, overall, and for the shoulders, chest, arms, neck, and stomach, received higher ratings than Shirt A. The differences between all these ratings are close 0.25 scale points and would suggest a real preference towards Shirt C. There was no evidence from the data that shrinkage due to laundering affected the fit over time.

### Design of Shirts

Four areas were examined to investigate the design of the shirts. The *overall look* of both shirts were rated favorably, with average ratings above *Like Moderately*. Over 93% of subjects stated that they had no restrictions to their activities. Those subjects that stated having some restriction, either had fit problems or their work necessitated wearing other garments. Eighty-seven percent of the subjects stated that both shirts were *suited* to their particular job. Shirt pockets were, on average, rated *Fairly Easy*. Thus, the design of the shirts met with favorable responses and the data indicate that they do not cause any major problems in the day-to-day functioning of a sailor.

### Durability

Wear time for both shirts was fairly high - 52 days for Shirt A/B and 46 days for Shirt C; although there was a difference between these two times, the period is large enough for durability to be assessed. Although both shirts were rated as being *Durable*, Shirt C, on average, was viewed as being more durable than Shirt A/B.

*Ease of care* proved to be a distinguishing factor between the two shirts. Subjects were asked to rate how well the shirts maintained their appearance after laundering. Shirt A/B received an average numerical rating of 2.28 which corresponds to the verbal rating of *Poorly*, while Shirt C's average rating of 3.91 corresponds to the verbal rating of *Well*. The mean rating of Shirt A/B was in the negative portion of the scale, and was over 1½ scale points lower than Shirt C. It appears, therefore, that Shirt A/B does not maintain its appearance very well after it has been laundered.

### Comfort

In hot conditions Shirt A/B received a mean rating for comfort in the negative portion of the scale ( $\bar{x} = 2.73$ ) (less than *acceptable*), while Shirt C received a mean rating in the positive end of the scale ( $\bar{x} = 3.28$ ) (above *acceptable*). This difference was accentuated at the endpoint. Shirt A/B's mean rating was 2.55 while Shirt C's was only 3.18. This decrease between data collections would be expected, as the midpoint data collection was conducted in the spring, while the endpoint collection was conducted in the summer. Thus, hotter weather would tend to exaggerate the difference in thermal comfort.

In cold conditions, both shirts were rated equally well for comfort, above the *acceptable* rating.

For overall comfort, Shirt C was preferred over Shirt A/B. Both ratings were however, above *acceptable*. The overall mean ratings for comfort dropped from the midpoint to the endpoint, again this was probably a function of the warmer weather.

### Overall

The final overall rating of the survey distinguished well between the two shirts. Shirt A/B received a mean overall rating of 3.16 (*Fair*) while Shirt C received an overall mean rating of 3.91 (*Good*). When male and female responses were also examined, the female mean overall scores accentuate the difference. Shirt A/B received a rating lower than *Fair*, while Shirt C received a rating higher than *Good*. The male mean overall score still favored Shirt C but the margin of difference was reduced.

### Conclusion

Clearly, the data indicate a preference for Shirt C. Although all fit data indicate that both shirts fit well, Shirt C consistently received statistically higher ratings in all of the fit areas. Similarly, even though both shirts have good average durability ratings (around *durable*), Shirt C again, had a significantly higher rating.

In addition, Shirt A/B data indicate that subjects found two negative attributes of the shirt. The ease of care data suggest that Shirt A/B maintained its appearance *poorly* after laundering. This is not a trivial problem since excess time spent on working with the shirt to obtain a professional military appearance could lead to a drop in productivity. Shirt A/B was also found to be slightly uncomfortable in hot weather, and its overall rating of comfort was significantly lower than that of Shirt C. Moreover, this was confirmed by the direct ranking of the two shirts. For both durability and appearance, Shirt C received significantly more number one rankings. This was especially true for appearance.

Shirt C appears to be an acceptable alternative to the current chambray shirt. All data for Shirt C were positive, and in general, it appeared to be well-liked. Sailors compared their most favored test shirt to the current dungaree shirt. Because Shirt C always received the higher ratings, it can be assumed that it was the shirt which was compared to the dungaree shirt most often.

However, the mean ratings for this comparison do not suggest that test participants favor Shirt C to the current chambray shirt. Upon examining the frequencies of response, 35% of the subjects said they preferred their favored test shirt, while an equal percentage preferred the current shirt. These data suggest that although Shirt C always received positive ratings, it was, at best, viewed on par with the current shirt.

### Pants

The fit rate for the pants was fairly low, with less than 60% of all subjects stating that they did not fit into one or more of the pants. Upon further examination, there was a significant difference in the fit rate of males and females. Approximately 69% of males were fit into all three pants, while only 37% of females were successfully fit into all three.



Upon examination of the fit data, the main problem of fit for females occurred with Pant C. Females were fit almost as successfully as males into Pants A and B, but only 53% of the female subjects were fit into Pant C. The most probable cause of this poor fit rate was the lack of correct sizes for female subjects at issue. Although a complete range of sizes was procured for the test, there were insufficient quantities of smaller sizes. This created a shortage in sizes, and some subjects could not be fit with their ideal size. The best fit possible was sought, but was not always achieved.

On the whole, the reasons male and female stated for not fitting into Pants A and B were the same - about 60% said the pants were too tight. In contrast, the reasons given by males and females were different for Pant C. Approximately 45% of male and only 21% of female subjects stated Pant C was too tight; while 39% of males 59% of females they were too loose.

A difference was found in the pattern of self-reported and issued sizes between the *pants*. With respect to Pants A and B, male issued sizes were, on average, 0.2" greater than self-reported sizes; and female issued sizes were, on average, one size greater. For Pant C, male self-reported and issue sizes did not differ, while the female issued size *decreased* by approximately 2 sizes. Comments taken from the surveys suggest that the pants were tight in the waist but baggy and loose around the hips and seat areas.

#### Fit of Pants

The overall length and crotch length of all the pants were rated as being *Just Right*. The fit of all the pants for the waist, seat area, thigh and overall were described as being a *Regular Fit*. The female score, however, for Pant C for the seat area, thigh, and overall fit was significantly different from the other scores. The female mean rating for Pant C was higher, suggesting that the fit of Pant C was slightly baggier than a *Regular Fit*.

In general, subjects rated their like or dislike of all pants as *Like Moderately*. This was the case for the *overall rating* and for the *waist, seat area, and thigh ratings*. There were, however, no practical differences among the pants.

The female rating for the waist did change from the midpoint to the endpoint ( $\bar{x} = 4.19$  and 3.67, respectively). This was quite a large change in perception of the fit. The midpoint rating was above *Like Moderately*, while the endpoint rating is between *Neither Like nor Dislike* and *Like Moderately*. This change could possibly be due to the effect of shrinkage in the garments from laundering.

### Design of Pants

Test participants stated they liked the overall look of the pants *Moderately*. This was true for all pants. Similarly, the design of the pant legs also had a mean rating of *Moderately*. When the male and female scores were compared for the *overall look*, males preferred Pants A and B over Pant C, while females preferred Pant C over Pants A and B.

Approximately 95% of the subjects found that they could accomplish all their daily activities in any of the pants, and over 91% stated that the garments were suited to their job. Comments from those who could not accomplish their daily tasks indicated that either specialized clothing was needed, or that there was a fit problem with a garment. Over 81% of subjects stated that they were able to easily stencil or attach their name tag to the pants.

Front and back pockets on all pants were acceptable to test participants, receiving ratings above *Like Moderately*.

### Durability

Total wear time, which was calculated by the number of test weeks multiplied by the number of days in a week that a garment was worn, differed among the pants (52 Days, 53 Days, and 47 Days for Pants A, B and C, respectively). This difference in wear time may be attributable to two factors: Pants A and B may have been favored more so they were worn more; or as there was no set wear rotation plan, Pant C may have been last in the wear rotation and was therefore worn for less time each week. All pants had mean ratings of durability above *Durable*. However, males rated Pants A and B as being more durable than Pant C, while the reverse was true for females (they rated Pant C more durable).

All pants had positive ratings for maintaining their appearance after laundering; however, a significant difference was found among the pants. Pants A and B had lower mean ratings than did Pant C. Again, there appears to be a gender difference, with females rating C higher than males.

Little shipboard laundering was done throughout the study. Over 57% of subjects stated that they never used the shipboard laundry, while only 10% to 14% used the shipboard laundry all the time.

### Comfort

For comfort in *hot and cold conditions* and *overall comfort*, ratings were all positive, and any differences had no practical meaning. However, when male and female ratings were closely examined, differences were evident. In hot conditions, the male scores were the same for all pants. The female scores, however, were different: for Pants A and B, ratings were close to *Acceptable* while, the rating for Pant C was close to *Comfortable*. There was a half scale point of

difference between the ratings for Pants A and B, and Pant C. This suggests that this difference is quite a strong effect. Thus, the females prefer the comfort of Pant C in hot weather, while the males find the comfort of all the pants the same.

### *Overall Rating*

All pants received a mean overall rating of *Good*. Males and females were, again, split over which pant they liked best. Males preferred Pants A and B, with ratings above *Good*; while the female score was below *Good*. In contrast, the male scores for Pant C were below *good* and the female scores above the *Good* marker. These data indicate that, overall, male subjects preferred either Pants A or B, and the females preferred Pant C.

### *Conclusion*

Examining the overall data for each pant type, there is very little which distinguishes any one of the three. All pants fit well in all areas. All received good durability ratings, and pockets which were fairly easy to use. All were comfortable in both hot and cold environments, and received similar overall ratings. There were two areas where Pant C was preferred over the other two pants, albeit slightly. In maintaining its appearance after laundering, Pant C was preferred over Pants A and B. Subjects also found it easier to stencil or attach their name to Pant C.

When male and female scores were viewed separately there was a divergence of opinion as to which pant was best. Males preferred Pants A and B over Pants C along the following factors: *overall look, durability, overall comfort*, and in their final *overall rating*. In contrast, females preferred Pant C over Pants A and B along the following factors: *overall design, overall look, overall comfort, comfort in hot weather*, and in their final *overall rating*.

The ranking data confirm this preference split between the males and females. For both data collection points, there were more top rankings given by males for Pants A and B than for Pant C. For females, Pant C received more top rankings than did Pants A and B. Although the combined male and female ranking data have significantly more number one ranks for Pants A and B, this is biased by the larger number of males serving as test participants.

All three pants seem to be acceptable alternatives to the current dungaree pant, because in general, the pants were all rated positively. When the subjects' most favored pant was compared to the current dungarees, the mean comparison ratings were between 2.7 and 2.8 for the four areas of comparison. This suggests that the current dungarees were liked less than the candidate uniforms. When the frequencies of response were examined, over 50% of the subjects stated they liked the current uniform less than their favored test uniform, with only 30% of the respondents stating that they like the current dungarees better.

The comparison data suggest that any of the three pants would be a suitable replacement to the dungaree uniform. Males favored the choice of pant A or pant B, while females favored Pant C.

## Recommendations

Although Shirt C received positive ratings, it showed no clear advantage over the current chambray shirt. In fact, it was rated lower than the current shirt. It therefore appears that the current shirt should be retained.

All Pants would make good replacements for the current dungaree pant. They all appeared to wear well over the six-month time period, and were rated as maintaining their appearance well after laundering. The pant pockets were easy to use, and over 80% of the subjects stated that the pants were suited to their job. Subjects rated the overall look between *like moderately* and *like very much*. Most importantly, when compared to the current dungarees, over half the subjects chose new pants over the current bell bottom dungarees. If a choice between the pants need be made Pant C should be chosen above Pants A and B, assuming that the female fit problem was due to a lack of particular sizes.

## **Appendix A: COTS Issue Sheet**

# Utility Uniform

## (Issue Sheet)

1. Name: \_\_\_\_\_
2. DOB: \_\_\_\_\_  
Day      Month      Year
3. Last Four: \_ \_ \_ \_
4. Rate: \_\_\_\_\_
5. Ship: \_\_\_\_\_
6. Division: \_\_\_\_\_
7. Sex: ☐ 1 Male  
(Check or X) ☐ 2 Female
8. Race: ☐ 1 American Indian / Alaskan Native  
(Check or X) ☐ 2 Asian / Pacific Islander  
☐ 3 Black (not of Hispanic Origin)  
☐ 4 Hispanic  
☐ 5 Mixed  
☐ 6 White (not of Hispanic Origin)  
☐ 7 Other: \_\_\_\_\_

### SUBJECT'S CLOTHING SIZES

#### Shirt Sizes

9. Shirt Size: ☐ 1 \_\_\_\_\_  
(Check or X) ☐ 2 XXS  
☐ 3 XS  
☐ 4 S  
☐ 5 M  
☐ 6 L  
☐ 7 XL  
☐ 8 XXL  
☐ 9 \_\_\_\_\_
10. Collar: \_\_\_\_\_ Inches
11. Sleeve: \_\_\_\_\_ Inches

#### Pant Sizes

12. Waist: \_\_\_\_\_ Inches
13. Inseam: \_\_\_\_\_ Inches
14. Length: ☐ 1 X Short  
(Check or X) ☐ 2 Short  
☐ 3 Medium  
☐ 4 Long  
☐ 5 X Long
15. Female Size: \_\_\_\_\_



## ISSUED SIZES

### Shirts

**A**

(Poly Cotton Poplin Shirt)

16. Shirt Size: ☐ 1 \_\_\_\_\_  
(Check or X) ☐ 2 XXS  
☐ 3 XS  
☐ 4 S  
☐ 5 M  
☐ 6 L  
☐ 7 XL  
☐ 8 XXL  
☐ 9 \_\_\_\_\_

17. Collar: \_\_\_\_\_ Inches

18. Sleeve: \_\_\_\_\_ Inches

19. Satisfactory fit obtained?

- (Check or X) ☐ 1 YES  
☐ 2 NO

**B**

(100% Cotton Chambray Shirt)

20. Shirt Size: ☐ 1 \_\_\_\_\_  
(Check or X) ☐ 2 XXS  
☐ 3 XS  
☐ 4 S  
☐ 5 M  
☐ 6 L  
☐ 7 XL  
☐ 8 XXL  
☐ 9 \_\_\_\_\_

21. Collar: \_\_\_\_\_ Inches

22. Sleeve: \_\_\_\_\_ Inches

23. Satisfactory fit obtained?

- (Check or X) ☐ 1 YES  
☐ 2 NO

### Pants

**A**

(Poly Cotton Twill Pant)

24. Waist: \_\_\_\_\_ Inches

25. Inseam: \_\_\_\_\_ Inches

26. Length: ☐ 1 Xshort  
(Check or X) ☐ 2 Short  
☐ 3 Medium  
☐ 4 Long  
☐ 5 Xlong

27. Female Size: \_\_\_\_\_

28. Satisfactory fit obtained?

- (Check or X) ☐ 1 YES  
☐ 2 NO

**B**

(100% Cotton Denim Pant)

29. Waist: \_\_\_\_\_ Inches

30. Inseam: \_\_\_\_\_ Inches

31. Length: ☐ 1 XShort  
(Check or X) ☐ 2 Short  
☐ 3 Medium  
☐ 4 Long  
☐ 5 XLong

32. Female Size: \_\_\_\_\_

33. Was a satisfactory fit obtained?

- (Check or X) ☐ 1 YES  
☐ 2 NO

34. Notes and Comments:-

## **Appendix B: COTS Wear Test Questionnaire**



# Utility Uniform

## (User Survey)

1. Name: \_\_\_\_\_

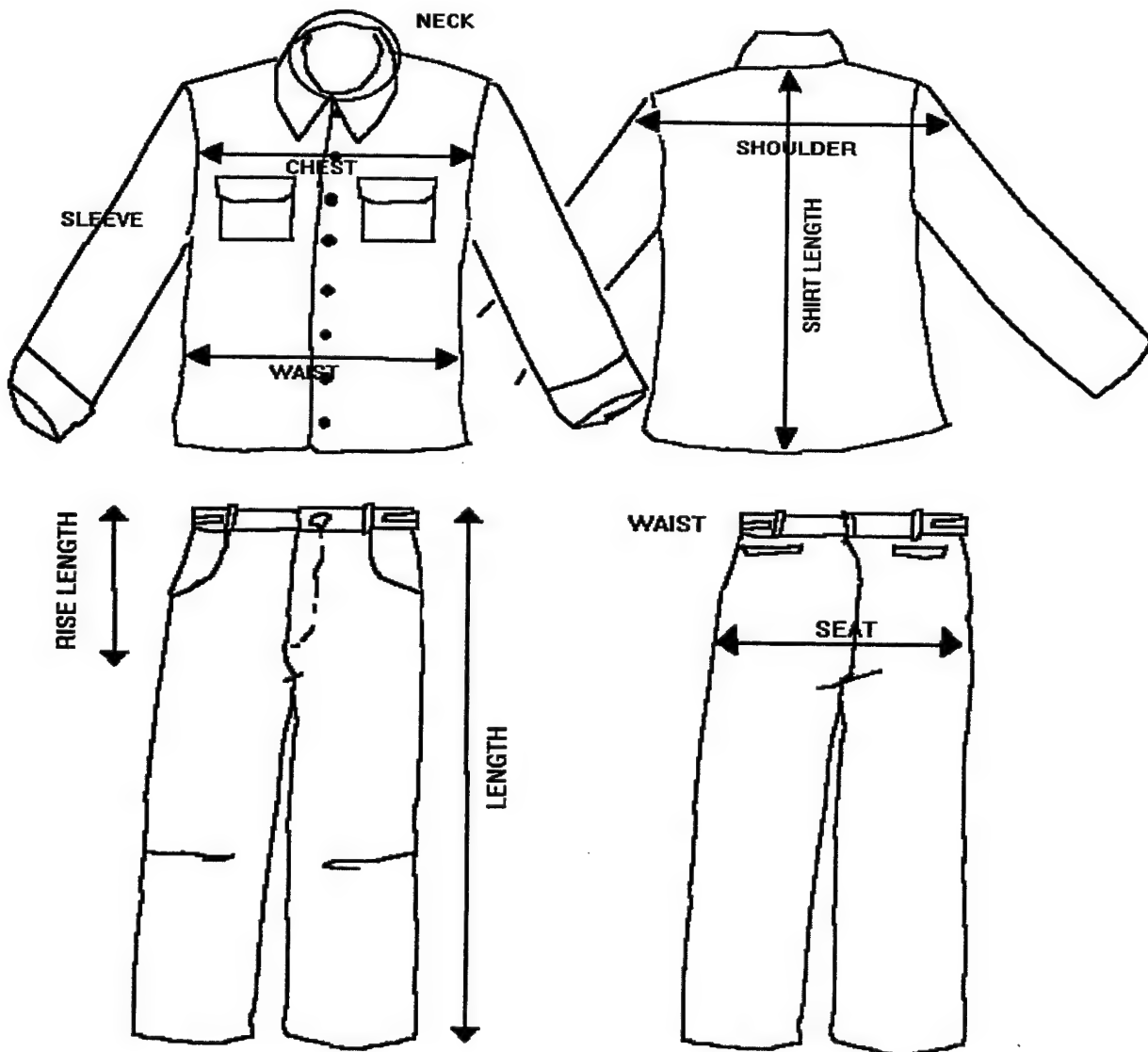
2. DOB: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

3. SSN: \_\_\_\_\_ (Last Four Numbers)

4. Date: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
Day Month Year

Thank you for your participation in this study. Answer each question as fully as possible for both types of uniform (shirts and pants). Please provide comments where asked for. If a question does not have comment space, reserve your comments until question 25.

For questions which ask about fit, please refer to the illustrations below.



## Preference of Fit

q1. For each garment please rate **how much you like the fit** for the areas listed, using the scale.

Scale:

Dislike  
Very Much  
1

Dislike  
Moderately  
2

Neither Like  
nor Dislike  
3

Like  
Moderately  
4

Like  
Very Much  
5

### Shirt A (Poplin)

5a. Overall Fit	1	2	3	4	5
6a. Across Shoulders	1	2	3	4	5
7a. Chest	1	2	3	4	5
8a. Sleeve	1	2	3	4	5
9a. Neck	1	2	3	4	5
10a. Waist	1	2	3	4	5

(Circle or X)

### Shirt B (Chambray)

5b. Overall Fit	1	2	3	4	5
6b. Across Shoulders	1	2	3	4	5
7b. Chest	1	2	3	4	5
8b. Sleeve	1	2	3	4	5
9b. Neck	1	2	3	4	5
10b. Waist	1	2	3	4	5

(Circle or X)

### Pant A (Twill)

11a. Overall Fit	1	2	3	4	5
12a. Waist	1	2	3	4	5
13a. Seat Area	1	2	3	4	5
14a. Length	1	2	3	4	5

(Circle or X)

### Pant B (Denim)

11b. Overall Fit	1	2	3	4	5
12b. Waist	1	2	3	4	5
13b. Seat Area	1	2	3	4	5
14b. Length	1	2	3	4	5

(Circle or X)

## Description of Fit

q2. For each garment please **describe the fit** for the areas listed, using the rating scale.

Scale:				
Very Tight 1	Moderately Tight 2	Neither Tight nor Loose 3	Moderately Loose 4	Very Loose 5

### Shirt A (Poplin)

15a. Overall Fit	1	2	3	4	5
16a. Across Shoulders	1	2	3	4	5
17a. Chest	1	2	3	4	5
18a. Sleeve	1	2	3	4	5
19a. Neck	1	2	3	4	5
20a. Waist	1	2	3	4	5

(Circle or X)

### Shirt B (Chambray)

15b. Overall Fit	1	2	3	4	5
16b. Across Shoulders	1	2	3	4	5
17b. Chest	1	2	3	4	5
18b. Sleeve	1	2	3	4	5
19b. Neck	1	2	3	4	5
20b. Waist	1	2	3	4	5

(Circle or X)

### Pant A (Twill)

21a. Overall Fit	1	2	3	4	5
22a. Waist	1	2	3	4	5
23a. Seat Area	1	2	3	4	5
24a. Length	1	2	3	4	5

(Circle or X)

### Pant B (Denim)

21b. Overall Fit	1	2	3	4	5
22b. Waist	1	2	3	4	5
23b. Seat Area	1	2	3	4	5
24b. Length	1	2	3	4	5

(Circle or X)

## Length

q3. For each garment please **evaluate the length** for the areas listed, using the scale below.

Scale:				
Much too Short 1	Slightly too Short 2	Just Right 3	Slightly too Long 4	Much too Long 5

Shirt A (Poplin)						(Circle or X)
25a. Sleeve Length	1	2	3	4	5	
26a. Overall Length	1	2	3	4	5	
Shirt B (Chambray)						(Circle or X)
25b. Sleeve Length	1	2	3	4	5	
26b. Overall Length	1	2	3	4	5	
Pant A (Twill)						(Circle or X)
27a. Leg Length	1	2	3	4	5	
28a. Rise (Crotch Length)	1	2	3	4	5	
Pant B (Denim)						(Circle or X)
27b. Leg Length	1	2	3	4	5	
28b. Rise (Crotch Length)	1	2	3	4	5	

## Design

q4. Please rate how you like the **overall look** of each garment.

Shirt	Really Dislike	Dislike	Fair	Like	Really Like	Please explain
29a. A (Poplin)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	30a. _____
29b. B (Chambray)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	30b. _____
Pant	Really Dislike	Dislike	Fair	Like	Really Like	Please explain
31a. A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	32a. _____
31b. B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	32b. _____

q5. Please rate how you like the design of the pant legs.

Pant	Really Dislike	Dislike	Fair	Like	Really Like	Please explain
33a. A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	34a. _____
33b. B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	34b. _____

q6. Please rate how easy it is to stencil or attach your name tag to each pair of pants.

Pant	Very Difficult	Somewhat Difficult	Fair	Somewhat Easy	Very Easy	Please explain
35a. A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	36a. _____
35b. B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	36b. _____

### Restriction in Activities

q7. Does the fit of the following garments restrict or hinder any of your daily activities?

Shirt	No	A Little	Some	A Lot	If YES then please describe activity
37a. A (Poplin)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	38a. _____
37b. B (Chambray)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	38b. _____
<b>Pant</b>					
39a. A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	40a. _____
39b. B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	40b. _____

### Suitability

q8. Please rate how suited each garment is for the work you do?

Shirt	Very unsuited	Somewhat unsuited	OK	Somewhat suited	Very suited	Why?
41a. A (Poplin)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	42a. _____
41b. B (Chambray)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	42b. _____
<b>Pant</b>						
43a. A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	44a. _____
43b. B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	44b. _____

### Pockets

q9. Please rate how easy the pockets are to use for your regular duties?

Shirt	Very Difficult	Somewhat Difficult	Fair	Somewhat Easy	Very Easy
45a. A (Poplin)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
45b. B (Chambray)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
<b>Pant</b>					
46a. A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
46b. B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

q10. Please choose all the reasons that best describe why your pockets are easy/not easy to use.

Shirt	Big	Small	High	Low	Deep	Shallow	Tight	Loose	Angle
47a. A (Poplin)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9
47b. B (Chambray)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9
<b>Pant</b>									
48a. A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9
48b. B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9

### Durability

q11. Please indicate whether you have experienced shrinkage, staining or fading in each garment.

		Shrinks	Stains	Fades	Please Explain
49a. Shirt	A (Poplin)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	50a. _____
49b.	B (Chambray)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	50b. _____
51a. Pant	A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	52a. _____
51b.	B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	52b. _____

### Durability Continued

q12. How durable are the following garments to rips, tears, abrasions, or failures in seams, fasteners, buttons etc.?

Shirt	Not Durable		Fair		Very Durable		Please explain.
53a. A (Poplin)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	54a.	_____
53b. B (Chambray)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	54b.	_____
<b>Pant</b>							
55a. A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	56a.	_____
55b. B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	56b.	_____

q13. For the following garments please indicate all areas that have any durability problems.

Shirt	Arms	Back	Chest	Collar	Front	Cuff	Pockets	Seams	Buttons
57a. A (Poplin)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9
57b. B (Chambray)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9
<b>Pant</b>									
	Legs	Knee	Front	Seat	Waist	Pockets	Seams	Buttons/ Zippers	Snap Crotch
58a. A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9
58b. B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9

### Frequency of Wear

q14. Have you been wearing the uniforms since the beginning of the test period until this point?

If NO - How many weeks have you worn them?

59a. Uniform A	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	60a.	_____
59b. Uniform B	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	60b.	_____

q15. How many days do you wear each uniform per week?

61a. Uniform A _____ Days per Week	61b. Uniform B _____ Days per Week
------------------------------------	------------------------------------

### Ease of Care

q16. Please rate how well each garment maintains its appearance after laundering.

Shirt	Very Poorly	Poorly	OK	Well	Very Well
62a. A (Poplin)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
62b. B (Chambray)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
<b>Pant</b>					
63a. A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
63b. B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5



q17. Please estimate the proportion of times your garments were shipboard laundered.

Always  
64. ☐1 100%   ☐2 80%   ☐3 60%   ☐4 40%   ☐5 20%   Never ☐6 0%   Other ☐7 \_\_\_\_

q18. How often do you launder each uniform?

64a. Uniform A: Every \_\_\_\_ Days

64b. Uniform B: Every \_\_\_\_ Days

### Comfort

q19. For the following conditions please rate how comfortable each garment is to wear.

Scale:				
Very Uncomfortable	Uncomfortable	Acceptable	Comfortable	Very Comfortable
1	2	3	4	5

#### Overall

Overall						Reason	
65a.	Shirt A	1	2	3	4	5	65a. _____
65b.	B	1	2	3	4	5	65b. _____
67a.	Pant A	1	2	3	4	5	67a. _____
67b.	B	1	2	3	4	5	67b. _____

#### When Hot

When Hot						Reason
69a. Shirt A	1	2	3	4	5	70a. _____
69b. B	1	2	3	4	5	70b. _____
71a. Pant A	1	2	3	4	5	72a. _____
71b. B	1	2	3	4	5	72b. _____

#### When Cold

When Cold						Reason		
73a.	Shirt A	1	2	3	4	5	74a.	
73b.	B	1	2	3	4	5	74b.	
75a.	Pant A	1	2	3	4	5	76a.	
75b.	B	1	2	3	4	5	76b.	

#### Overall

q20. Please give an overall rating for each garment.

Shirt	Very Poor	Poor	Fair	Good	Very Good
77a. A (Poplin)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
77b. B (Chambray)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Pant	Very Poor	Poor	Fair	Good	Very Good
78a. A (Twill)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
78b. B (Denim)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

### Comparison

**q21.** For the following categories please compare the two garments you have been wearing.

Scale:					
Like A Much LESS than B		Like A & B Same			Like A Much MORE than B
1	2	3	4	5	

79. Fit of Shirt	1	2	3	4	5
80. Fit of Pants	1	2	3	4	5
81. Comfort of Shirt	1	2	3	4	5
82. Comfort of Pants	1	2	3	4	5
83. Durability of Shirt	1	2	3	4	5
84. Durability of Pants	1	2	3	4	5
85. Appearance of Shirt	1	2	3	4	5
86. Appearance of Pants	1	2	3	4	5

(Circle or X)

**q22.** For the following categories please compare the garment you liked the most (A or B) to the **CURRENT utility uniform** (Dungaree Uniform).

Scale:					
Like CURRENT Much LESS		Like Same			Like CURRENT Much MORE
1	2	3	4	5	

87. Fit of Shirt	1	2	3	4	5
88. Fit of Pants	1	2	3	4	5
89. Comfort of Shirt	1	2	3	4	5
90. Comfort of Pants	1	2	3	4	5
91. Durability of Shirt	1	2	3	4	5
92. Durability of Pants	1	2	3	4	5
93. Appearance of Shirt	1	2	3	4	5
94. Appearance of Pant	1	2	3	4	5

(Circle or X)

**q23.** Would you like to see the current "Bell Bottoms" retained on any new utility uniform?

95. ☐1 Yes ☐2 No 96. Please explain: \_\_\_\_\_

**q24.** Would you like to see a prescribed method of rolling up shirt sleeves?

97. ☐1 Yes ☐2 No 98. Please explain: \_\_\_\_\_

**q25.** Please provide any further comments you may have about the uniforms you have been wearing.  
If you need extra space please use the back of this survey.

99. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



### **Appendix C: Example Issue Sheet**

# Utility Uniform

## (Issue Sheet)

1. Name: \_\_\_\_\_ 5. Phone: (    ) - \_\_\_\_\_
2. DOB: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
Day Month Year
3. SSN: \_\_\_\_\_ (Last Four Numbers) 7. Ship: \_\_\_\_\_
4. Sex: ☐ 1 Male 8. Division: \_\_\_\_\_  
(Check or X) ☐ 2 Female
9. Race: ☐ 1 American Indian / Alaskan Native  
(Check or X) ☐ 2 Asian / Pacific Islander  
☐ 3 Black (not of Hispanic Origin)  
☐ 4 Hispanic  
☐ 5 Mixed  
☐ 6 White (not of Hispanic Origin)  
☐ 7 Other: \_\_\_\_\_

(Shaded area to be filled in by Issuer)

### TEST PARTICIPANT'S SELF REPORTED CLOTHING SIZES

#### Shirt Sizes

10. Shirt Size: ☐ 1 XXS  
(Check or X) ☐ 2 XS  
☐ 3 S  
☐ 4 M  
☐ 5 M-L  
☐ 6 L  
☐ 7 XL  
☐ 8 XXL  
☐ 9 XXXL  
☐ 10 Other

11. Other Size: \_\_\_\_\_

#### Pant Sizes

##### Male

12. Waist: \_\_\_\_\_ Inches
13. Inseam: \_\_\_\_\_ Inches

##### Female

14. Size: \_\_\_\_\_
15. Length: \_\_\_\_\_  
(S, R, L, XL)

## ISSUED SIZES

### Shirts

**A/B**

(Chambray)

16. Shirt Size: ☐ 1 S  
(Check or X) ☐ 2 M  
☐ 3 M-L  
☐ 4 L  
☐ 5 XL  
☐ 6 XXL

17. Satisfactory fit obtained?

- (Check or X) ☐ 1 YES  
☐ 2 NO

**C**

(Poplin)

18. Shirt Size: ☐ 1 S  
(Check or X) ☐ 2 M  
☐ 3 M-L  
☐ 4 L  
☐ 5 XL  
☐ 6 XXL

19. Satisfactory fit obtained?

- (Check or X) ☐ 1 YES  
☐ 2 NO

### Pants

**B**

**A**

(14.5 Oz. Denim Pant)

**Male**

20. Waist: \_\_\_\_\_ In.  
21. Inseam: \_\_\_\_\_ In.

**OR**

**Female**

22. Size: \_\_\_\_\_  
23. Length: ☐ 1 R ☐ 2 L

24. Satisfactory fit obtained?

- (Check or X) ☐ 1 YES  
☐ 2 NO

(11.3 Oz. Denim Pant)

**Male**

25. Waist: \_\_\_\_\_ In.  
26. Inseam: \_\_\_\_\_ In.

**OR**

**Female**

27. Size: \_\_\_\_\_  
28. Length: ☐ 1 R ☐ 2 L

29. Satisfactory fit obtained?

- (Check or X) ☐ 1 YES  
☐ 2 NO

**C**

(Twill Pant)

**Male**

30. Waist: \_\_\_\_\_ In.

**OR**

**Female**

31. Size: \_\_\_\_\_  
32. Length: ☐ 1 R ☐ 2 L

33. Satisfactory fit obtained?

- (Check or X) ☐ 1 YES  
☐ 2 NO

34. Notes and Comments:-

## **Appendix D: Utility Uniform Wear Test**

### **Utility Uniform Wear Test**

Thank you for participating in this wear test. The Navy Clothing and Textile Research Facility (NCTRF) is investigating a number of utility uniform designs. You have been chosen to evaluate two designs. Uniform A consists of a Poplin medium blue shirt with a twill navy blue trouser. Uniform B has a Chambray washed-blue shirt with denim trousers. Each uniform will be marked with the appropriate letter on the garment tags.

By taking part in this study your views, opinions, and preferences are important. You have the ability to influence the future design of the Navy's utility uniform. All of your comments will be treated in confidence and are greatly appreciated.

#### **Instructions**

Please wear both uniforms in place of your standard utility uniform. Launder the uniforms as necessary, but continually wear one or other of the uniforms. For example you start by wearing uniform B until it needs laundering. Switch to wearing uniform A. Then when uniform A needs laundering wear B.

This wear test will last approximately six months. The objective of the wear test is to compare the uniforms for: fit, design, suitability to your job, uniform functionality, durability, ease of care, and comfort. You will be visited by a team from NCTRF after about three and six months and will be asked to complete a survey each time. It is important to fill out these surveys as completely as possible, as this is where your views, opinions, and preferences will be collected.

If you have any questions please see your test monitor.

# Utility Uniform

## (User Survey)

1. Name: \_\_\_\_\_

2. DOB: \_\_\_\_\_

\_\_\_\_ / \_\_\_\_ / \_\_\_\_  
Day      Month      Year

3. SSN:      - - - -      (Last Four Numbers)

4. Date: \_\_\_\_\_

\_\_\_\_ / \_\_\_\_ / \_\_\_\_  
Day      Month      Year

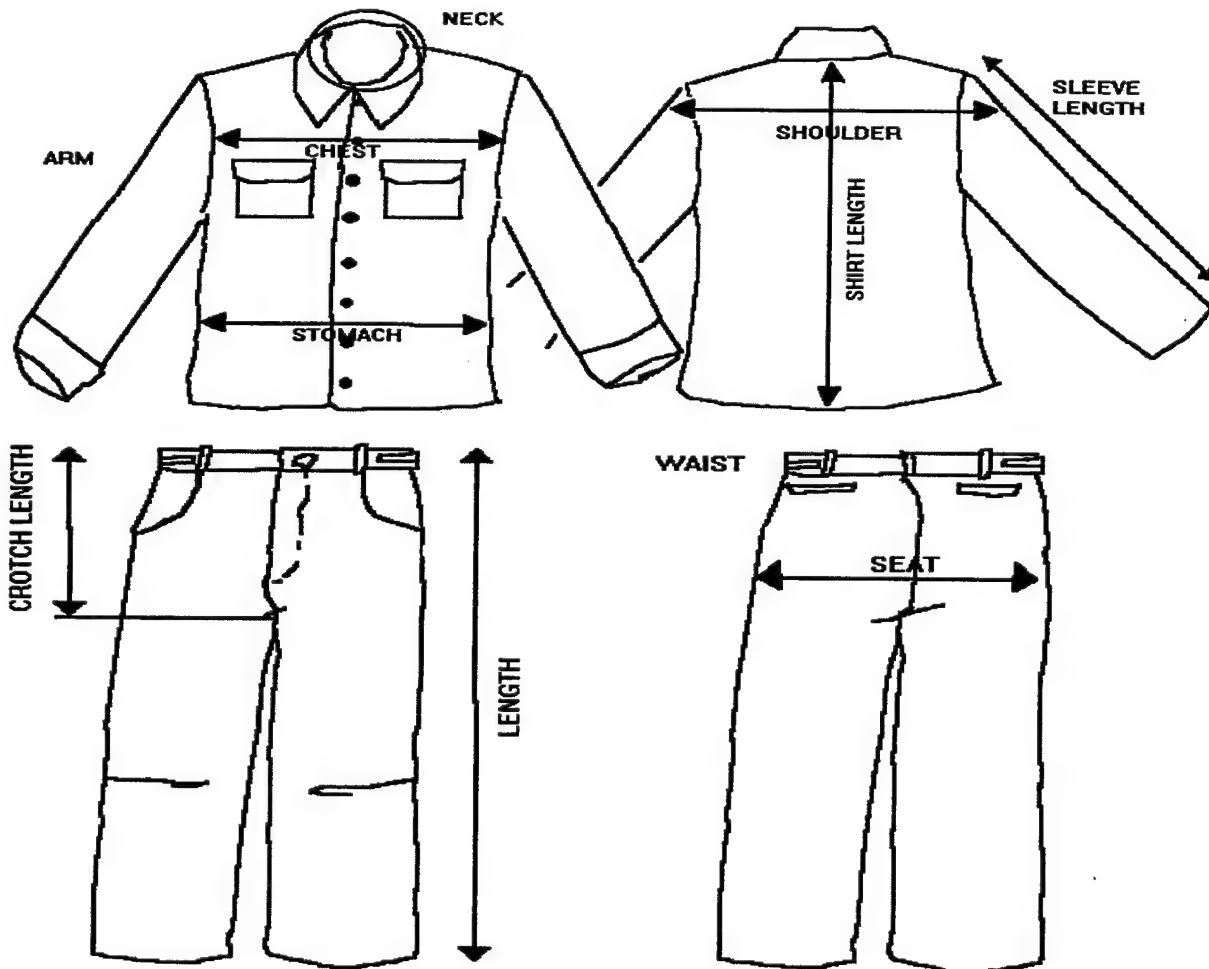
4s. Ship or Command: \_\_\_\_\_

Thank you for your participation in this study. Answer each question as fully and honestly as possible for each of the three uniforms (including the shirt and pants). Please provide comments where asked for. If a question does not have space, please reserve your comments until question 24.

For questions which give a number of choices as answers please **CHECK or FILL** the circle next to your response or responses. For example:

q30x. Are you currently on active duty?    29. ☒ 1 Yes    ☐ 2 No

For questions which ask about fit, please refer to the illustrations below.



## Fit of Uniforms

q1a. Overall, do the following **SHIRTS** fit?

Shirt		If <b>NO</b> was the Shirt..			Please explain...	
5a. <b>A/B</b>	<input type="radio"/> 1 Yes <input type="radio"/> No ⇒	<input type="radio"/> 2 Too Tight	<input type="radio"/> 3 Too Loose	<input type="radio"/> 4 Other	⇒ 6a.	_____
5c. <b>C</b>	<input type="radio"/> 1 Yes <input type="radio"/> No ⇒	<input type="radio"/> 2 Too Tight	<input type="radio"/> 3 Too Loose	<input type="radio"/> 4 Other	⇒ 6c.	_____

q1b. Overall, do the following **PANTS** fit?

Pant		If <b>NO</b> were the Pants..			Please explain...	
7a. <b>A</b>	<input type="radio"/> 1 Yes <input type="radio"/> No ⇒	<input type="radio"/> 2 Too Tight	<input type="radio"/> 3 Too Loose	<input type="radio"/> 4 Other	⇒ 8a.	_____
7b. <b>B</b>	<input type="radio"/> 1 Yes <input type="radio"/> No ⇒	<input type="radio"/> 2 Too Tight	<input type="radio"/> 3 Too Loose	<input type="radio"/> 4 Other	⇒ 8b.	_____
7c. <b>C</b>	<input type="radio"/> 1 Yes <input type="radio"/> No ⇒	<input type="radio"/> 2 Too Tight	<input type="radio"/> 3 Too Loose	<input type="radio"/> 4 Other	⇒ 8c.	_____

### Length

Scale:	Too Short	Just Right	Too Long
	1	2	3

q2a. For each **SHIRT** please **evaluate the length** for the areas listed, using the scale above.

	Shirt A/B			Shirt C		
	1	2	3	1	2	3
9. Sleeve Length	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Overall Length	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>

q2b. For each pair of **PANTS** please **evaluate the length** for the areas listed, using the above scale.

	Pant A			Pant B			Pant C		
	1	2	3	1	2	3	1	2	3
11. Leg Length	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Crotch Length	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Describe the Fit

q3a. For each **SHIRT** please describe the **FIT** for the following areas:

	Shirt A/B			Shirt C		
	Close Fitting	Regular Fit	Baggy Fit	Close Fitting	Regular Fit	Baggy Fit
13. Overall Fit	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Shoulders	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Chest	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Arms	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. Neck	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Stomach	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Describe the Fit (Continued)

q3b. For each pair of **PANTS** please describe the **FIT** for the following areas:

	Pant A			Pant B			Pant C		
	Close Fitting	Regular Fit	Baggy Fit	Close Fitting	Regular Fit	Baggy Fit	Close Fitting	Regular Fit	Baggy Fit
19. Overall Fit	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. Waist	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. Seat Area	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. Thigh	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Rating of Fit

Scale:

Dislike  
Very Much  
1

Dislike  
Moderately  
2

Neither Like  
nor Dislike  
3

Like  
Moderately  
4

Like  
Very Much  
5

q4a. For each **SHIRT** please rate how much you like or dislike the **FIT** for the areas listed, using the scale above.

	Shirt A/B					Shirt C					
	1	2	3	4	5		1	2	3	4	5
23. Overall Fit	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. Shoulders	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. Chest	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. Arms	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. Neck	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. Stomach	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

q4b. For each pair of **PANTS** please rate how much you like or dislike the fit for the areas listed, using the scale.

	Pant A					Pant B					Pant C						
	1	2	3	4	5		1	2	3	4	5		1	2	3	4	5
29. Overall Fit	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. Waist	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
31. Seat Area	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
32. Thigh	a. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c. <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Design of Uniforms

q5a. Please rate how you like or dislike the overall **LOOK** of each **SHIRT**.

Shirt	Dislike Very Much	Dislike Moderately	Neither Like Nor Dislike	Like Moderately	Like Very Much	Please explain
33a. A/B	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5 ⇨	34a. _____
33c. C	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5 ⇨	34c. _____



## Design of Uniforms (Continued)

q5b. Please rate how you like or dislike the overall LOOK of each pair of PANTS

Pant	Dislike Very Much	Dislike Moderately	Neither Like Nor Dislike	Like Moderately	Like Very Much	Please explain
35a. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5 ⇨	36a. _____
35b. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5 ⇨	36b. _____
35c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5 ⇨	36c. _____

q6. Please rate how you like or dislike the DESIGN OF THE PANT LEGS for each pair of PANTS

Pant	Dislike Very Much	Dislike Moderately	Neither Like Nor Dislike	Like Moderately	Like Very Much	Please explain
37a. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5 ⇨	38a. _____
37b. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5 ⇨	38b. _____
37c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5 ⇨	38c. _____

q7. Are you able to EASILY stencil or attach your name tag to each pair of PANTS?

Pant	YES	NO	If NO	Please explain the problem
39a. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2	⇨	40a. _____
39b. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2	⇨	40b. _____
39c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	⇨	40c. _____

## Restriction in Activities

q8. Are you able to perform ALL of your daily activities while wearing the following garments?

Shirt	YES	NO	If NO were you restricted:	AND describe your activity.
			A Little OR A Lot	
41a. <b>A/B</b>	<input type="radio"/> 1	<input type="radio"/>	⇨ <input type="radio"/> 3	<input type="radio"/> 4 ⇨ 42a. _____
41c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/>	⇨ <input type="radio"/> 3	<input type="radio"/> 4 ⇨ 42c. _____
Pant				
43a. <b>A</b>	<input type="radio"/> 1	<input type="radio"/>	⇨ <input type="radio"/> 3	<input type="radio"/> 4 ⇨ 44a. _____
43b. <b>B</b>	<input type="radio"/> 1	<input type="radio"/>	⇨ <input type="radio"/> 3	<input type="radio"/> 4 ⇨ 44b. _____
43c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/>	⇨ <input type="radio"/> 3	<input type="radio"/> 4 ⇨ 44c. _____

## Suitability

q9. Are the following garments suited for your particular Job?

Shirt	YES	NO	If NO please describe what needs to be changed to make it ideal for your specific job.
45a. <b>A/B</b>	<input type="radio"/> 1	<input type="radio"/> 2 ⇨	46a. _____
45c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2 ⇨	46c. _____
Pant			
47a. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2 ⇨	48a. _____
47b. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2 ⇨	48b. _____
47c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2 ⇨	48c. _____

## Pockets

q10. For each garment, please rate how easy or difficult the pockets are to use for your regular duties?

Shirt	Very Difficult	Fairly Difficult	Acceptable	Fairly Easy	Very Easy		Please Explain
49a. <b>A/B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	⇒ 50a.	_____
49c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	⇒ 50c.	_____

### Pant (Front Pockets)

51a. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	⇒ 52a.	_____
51b. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	⇒ 52b.	_____
51c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	⇒ 52c.	_____

### Pant (Rear Pockets)

51ar. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	⇒ 52ar.	_____
51br. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	⇒ 52br.	_____
51cr. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	⇒ 52cr.	_____

q11. If the pockets were **not acceptable or difficult** to use please check ALL the reasons why they were this way.

Shirt	Too Big	Too Small	Too High	Too Low	Too Deep	Too Shallow	Too Tight	Too Loose	Wrong Angle	Wrong Location
53a. <b>A/B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
53c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

### Pant (Front Pockets)

54a. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
54b. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
54c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

### Pant (Rear Pockets)

54ar. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
54br. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
54cr. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

## Durability

**q12.** Please indicate all the types of durability problems you have found with each SHIRT and pair of PANTS.

Shirt	Shrinks	Stains	Fades	Rips/ Tears	Seams Fail	Fasteners Fail	Buttons Fail	Abrasions	Other	If <b>OTHER</b> describe problem.
55a. <b>A/B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9 ⇒	56a. _____
55b. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9 ⇒	56c. _____

Pant	Shrinks	Stains	Fades	Rips/ Tears	Seams Fail	Fasteners Fail	Buttons Fail	Abrasions	Other	If <b>OTHER</b> describe problem.
57a. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9 ⇒	58a. _____
57b. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9 ⇒	58b. _____
57c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9 ⇒	58c. _____

**q13.** For the following garments please indicate all areas that have any durability problems.

Shirt	Arms	Back	Chest	Collar	Front	Cuff	Pockets	Seams	Buttons
59a. <b>A/B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9
59b. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9

Pant	Legs	Knee	Front	Seat	Waist	Pockets	Seams	Zippers	Buttons/ Snaps	Crotch
60a. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
60b. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
60c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

**q14.** Overall please rate how durable or not durable each garment is.

Shirt	Not Durable	Fairly Durable	Durable	Very Durable		Please explain
61a. <b>A/B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	⇒	62a. _____
61c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	⇒	62c. _____

Pant	Not Durable	Fairly Durable	Durable	Very Durable		Please explain
63a. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	⇒	64a. _____
63b. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	⇒	64b. _____
63c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	⇒	64c. _____

## Frequency of Wear

**q15.** Have you been wearing the uniforms since the **beginning of the test period until this point?**

Uniform		If <b>NO</b> - How many weeks have you worn them?	
65a. <b>A</b>	<input type="radio"/> 1 Yes <input type="radio"/> 2 No	⇒	66a. _____ Weeks
65b. <b>B</b>	<input type="radio"/> 1 Yes <input type="radio"/> 2 No	⇒	66b. _____ Weeks
65c. <b>C</b>	<input type="radio"/> 1 Yes <input type="radio"/> 2 No	⇒	66c. _____ Weeks

**q16.** How many **days** do you wear **each** uniform **per week**?

67a. Uniform **A** \_\_\_\_\_ Days

67b. Uniform **B** \_\_\_\_\_ Days

67c. Uniform **C** \_\_\_\_\_ Days

## Ease of Care

**q17.** Please rate **how well or how poorly** each garment **maintains its appearance after laundering**.

Shirt	Very Poorly	Poorly	OK	Well	Very Well
68a. <b>A/B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
68c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

Pant	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
69a. <b>A</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
69b. <b>B</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
69c. <b>C</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

**q18.** Please **estimate** the proportion of the time your garments are/were shipboard laundered.

Always	Three Quarters	Two Thirds	Half the Time	One Third	One Quarter	Never	Other
70. <input type="radio"/> 1 100%	<input type="radio"/> 2 75%	<input type="radio"/> 3 66%	<input type="radio"/> 4 50%	<input type="radio"/> 4 33%	<input type="radio"/> 5 25%	<input type="radio"/> 6 0%	<input type="radio"/> 7 _____

**q19.** How often do you launder each uniform?

71a. Uniform **A**: Every \_\_\_\_\_ Days

71b. Uniform **B**: Every \_\_\_\_\_ Days

71c. Uniform **C**: Every \_\_\_\_\_ Days

**Comfort****Scale:**

Very Uncomfortable	Uncomfortable	Acceptable	Comfortable	Very Comfortable
1	2	3	4	5

**q20a.** For the following conditions please rate how **comfortable or uncomfortable** each **SHIRT** is to wear.

		Shirt A/B						Shirt C				
		1	2	3	4	5		1	2	3	4	5
72. In Hot Conditions	a.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
73. In Cold Conditions	a.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
74. Overall	a.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**q20b.** For the following conditions please rate how **comfortable or uncomfortable** each pair of **PANTS** is to wear.

		Pant A						Pant B						Pant C				
		1	2	3	4	5		1	2	3	4	5		1	2	3	4	5
75. In Hot Conditions	a.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
76. In Cold Conditions	a.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
77. Overall	a.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Overall**

**q21.** Please give an **overall** rating for each garment.

Shirt	Very Poor	Poor	Fair	Good	Very Good
78a. A/B	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
78c. C	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Pant					
79a. A	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
79b. B	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
79c. C	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

**q22.** Would you like to see the current "Bell Bottoms" retained on any new Utility Uniform?

80. ☐ 1 Yes ☐ 2 No 81. Please explain your answer: \_\_\_\_\_

**q23.** Would you like to see a prescribed method of rolling up shirt sleeves?

82. ☐ 1 Yes ☐ 2 No 83. Please explain your answer: \_\_\_\_\_

**q24.** Please provide any further comments you may have about the uniforms you have been wearing. If you need extra space please use the back of this survey.

84. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Please turn over to complete the comparison section...

## Comparison

**q25a.** For each of the following categories please rank the two **SHIRTS** in order of preference.

(1= Most Favored to 2= Least Favored. If you like the shirts the **same**, give them an **equal rating**.)

Shirt A/B

Shirt C

85. Fit of Shirt	Rank:	Rank:
86. Comfort of Shirt	Rank:	Rank:
87. Durability of Shirt	Rank:	Rank:
88. Appearance of Shirt	Rank:	Rank:

(1 = Most Favored, 2 = Least Favored)

**q25b.** For each of the following categories please rank the three pairs of **PANTS** in order of preference.

(1= Most Favored to 3= Least Favored. If you like the pants the **same** give them an **equal rating**.)

Pants A

Pants B

Pants C

89. Fit of Pants	Rank:	Rank:	Rank:
90. Comfort of Pants	Rank:	Rank:	Rank:
91. Durability of Pants	Rank:	Rank:	Rank:
92. Appearance of Pants	Rank:	Rank:	Rank:

(1 = Most Favored Pant, 2 = second Most Favored, 3 = Least Favored)

### Scale:

Like Current Much Less	Like Current Less	Like Current Same	Like Current More	Like Current Much More
1	2	3	4	5

## Comparison to Dungarees

**q26a.** For the following categories please compare **the SHIRT you like the most** (A/B or C) to the **CURRENT utility uniform** (Dungaree Uniform), using the scale above.

93. Fit of Shirt	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
94. Comfort of Shirt	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
95. Durability of Shirt	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
96. Appearance of Shirt	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

**q26b.** For the following categories please compare **the pair of PANTS you like the most** (A, B or C) to the **CURRENT utility uniform** (Dungaree Uniform), using the scale above.

97. Fit of Pants	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
98. Comfort of Pants	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
99. Durability of Pants	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
100. Appearance of Pants	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5

*Thank you for your help and participation*